Volume 19, No. 6 June 2000

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Monitoring Times

Your Personal Communications Source

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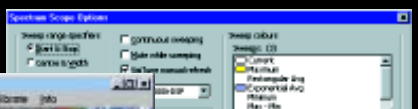

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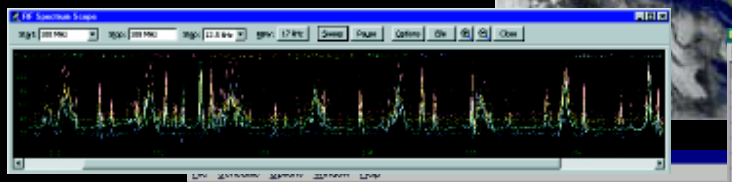

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Monitoring Times

Vol. 19, No. 6 June 2000

Field Trip for the Scanner Listener

By Gary Webbenhurst

Looking for a bit of stress relief that would also help you brush up on your hobby? Head for the hills! There's nothing like taking a field trip to a nearby mountain peak for the ultimate exercise in scanning. You must do a little advance preparation, but the end result will be an enjoyable and very productive outing. Story on page 19.

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Review:

Our reviewers, Wayne Mishler and Ben Hester, were very well impressed with the **Palstar R30** – the new, no-nonsense shortwave receiver from Palstar. It received high points for sensitivity, overall performance, ease of operation, and quality feel (see p.98). The **PRO-2052** trunk tracker scanner, made by Uniden for Radio Shack, received mixed marks from Bob Parnass, who found it an excellent radio trapped inside annoying ergonomics (p.100).

What's new on the CB scene? asks Jock Elliott. He reviews three new models from **Cherokee** and **Cobra** – one of which receives his highest personal recommendation (p. 96). Let your computer do the notching... Catalano looks at more digital signal processing programs available to the consumer to clean up audio signals and even get rid of annoying whistles and beeps (p.94).

Bob Grove tests both the base and mobile **NilJon** scanner antennas, confirms their quality, and gets an unexpected surprise (p.104).

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More Anti-Wireless Easvesdropping Legislation Proposed

On March 29th, U.S. Senators Ron Wyden (D-Oregon) and Conrad Burns (R-Montana) introduced the *Wireless Eavesdropping Protection Act of 2000* into the U.S. Senate.

Senate bill S.2326 is identical in every respect to H.R.514 *Wireless Privacy Enhancement Act*, which passed the House in Feb 1999, and has been sitting in the Senate Commerce Committee ever since. Its intent is to assure the nation's 86 million wireless phone subscribers that their wireless telecommunications remain private, and provides for new penalties for those who attempt to "listen in" on private communications.

Ron Wyden said "This bill will enhance the privacy rights of wireless subscribers by strengthening the laws that prohibit eavesdropping wireless communications. Since the early days of wireless communications, Congress has paid particular attention to the privacy rights of wireless subscribers. Unfortunately, despite our best efforts, electronic eavesdroppers have been able to find loopholes in the law."

"Using the loopholes, electronic eavesdroppers have been able to develop a 'gray market' for modified and modifiable wireless scanners. Some of these individuals even advertise in magazines and on Internet websites that their products can be altered easily to pick up cellular communications. The information and equipment necessary to make these modifications are also widely advertised, sometimes with blatant offers to unblock the cellular frequencies after the equipment is purchased."

The Wireless Eavesdropping Protection Act attacks these problems on several fronts. First, it would expand the definition of the frequencies that may not be scanned to include digital Personal Communications Service (PCS) frequencies as well as cellular ones. The legislation recognizes that some frequencies are shared between commercial mobile services and public safety users, and that the use of scanners to monitor public safety communications may assist in saving lives.

"Second, the bill would clarify that it is just as illegal to modify scanners for the purpose of eavesdropping as it is to manufacture or import them for this purpose, and it would direct the FCC to modify its rules to reflect this change," Wyden said.

"The bill also would amend current law to prohibit either the intentional interception or the intentional divulgence of wireless communications, so that either action on its own would be prohibited. Finally, the bill would require the FCC to investigate and take action on wireless privacy violations, regardless of any other investigative or enforcement action by any other federal agency. This provision would help ensure that these newly strengthened privacy protections are fully enforced in the future."

Specifically, the bill:

- Bans scanners capable of eavesdropping on wireless calls, regardless of what type of technology is used to transmit the calls;
- Bans the modification of off-the-shelf scanners, which can then be used to eavesdrop on wireless conversations;
- Directs the Federal Communications Commission to address the issue of modifying scanners, and also to consider placing labels on scanners that warn it is a violation of Federal law to intercept or divulge wireless communications;
- Enables the FCC to adopt regulations to enhance privacy when commercial wireless services and public safety users share portions of the radio frequency spectrum;
- Explicitly prohibits the unauthorized interception of wireless communications, as well as divulging its content; and
- Grants the FCC authority to investigate the unauthorized interception or publication of wireless communications, and to impose fines where warranted.

Goal of "Anytime, Anywhere" Communications Within Reach

The Federal Communications Commission has released a *Notice of Inquiry* (NOI) seeking information on "Software Defined Radio" technology or SDR for short. The FCC believes that software defined radios could significantly affect a number of Commission functions, including spectrum allocation, spectrum assignment, and equipment approval. In particular, they want to know how SDR could help them make more efficient use of the crowded radio spectrum.

The FCC said in the NOI "Software defined radios could offer tremendous advantages to consumers over currently available wireless equipment. These benefits include lower cost, a greater variety of features, and the ability to adapt to multiple communication standards. They could also offer advantages to manufacturers, such as increased economies of scale in production, increased worldwide market opportunities, and a decrease in the number of devices that must be maintained in inventory. Software defined radios could expand access to broadband communications for all persons and increase competition among telecommunication service providers."

Today, the radio communications world is defined by hardware. Radio equipment is manufactured to receive and transmit certain types of radio waves on certain frequencies. The FCC licenses specific frequencies to specific users. If the spectrum is not being used by the licensee, it goes unused.

With software defined radio the FCC might be able to allow many different radio services to use the same spectrum. Frequency license holders might be able to lease out their unused capacity to others. The technology enables devices to seek out pockets of unused spectrum and to shift operation to those frequencies.

In SDR technology, a laptop computer is interfaced between the different systems. Each radio system becomes an address on the computer which can be linked together. SDR can be used to talk across different radio systems ...every radio becomes compatible with every other type. The commercial possibilities are endless since SDR could link any dissimilar radio-wave-based communications together.

In a software defined radio, functions that were formerly carried out solely in hardware, such as the generation of the transmitted radio signal and the tuning and detection of the received radio signal, are performed by software residing in high-speed digital signal processors. The fact that these functions are carried out in software means that the radio can be programmed to transmit and receive over a wide range of frequencies and to emulate virtually any different desired transmission format.

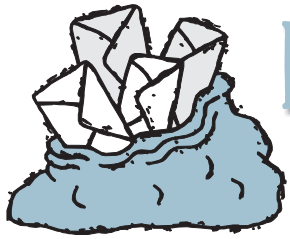
By using a computer to define what your radio equipment does, it can be an AM radio one minute ...or an VHF/UHF FM or shortwave SSB radio the next. Changing from one mode to another is similar to loading a different application on your PC. SDR has the potential to completely revolutionize 2-way radio equipment and communication.

Wireless technology under development holds the promise of letting phones and radios of the future be updated as new cutting-edge services become available. The technology could reduce the need for consumers to get additional equipment or hardware to access advanced services as they evolve.

The U.S. military is already using the technology and has a multimillion dollar contract with Motorola to develop SDR. The system relies on the firm's *Wireless Information Transfer System* or WITS. Basically the system receives one mode, converts it to digital and ships it out to a universal device. Software-defined radio helps to make incompatible systems work with each other.

SDR has the potential to eliminate the need for different types of receiving and transmitting hardware and to change the way users can communicate across traditional services. As it is now, public safety personnel operating on different frequencies can not communicate with one another. With SDR, it is merely a matter of linking the two addresses.

It could be several years before consumers see software-defined radio devices in the marketplace. Comments close on June 14, 2000; and reply comments July 14, 2000.



LETTERS TO THE EDITOR

Let's Share Good Scanner News

"I slip out and buy a copy of *Monitoring Times* on my lunch hour. I do not subscribe because then I would have no excuse for my monthly trip to the book store!

"My favorite part of *MT* is the *Communications* column. Can we please have more stories about good deeds done by scanner listeners? Let's encourage readers to send in tales of rescues and bad guys being caught due to folks listening to their scanner, then doing the right thing. Humorous scanner stories are great too! Thanks!"

– John Henderson, Richardson, Texas

Thanks, John. We do try! Keep sending those clippings, folks. In addition to printing the stories in MT, we occasionally have opportunity to forward the best examples to reporters who are writing scanner-related stories.

Money, Religion, and Radio

"I work in the communications industry and I'm ham radio operator N4VVT. I enjoy *Monitoring Times* and truly believe it is the best publication and the only one to cover topics from A to Z in the monitoring/ham hobby. I think highly of not only you [Bob] personally but all the folks who work for you. They are both friendly and knowledgeable when you ask a question or an opinion.

"With all that said, I was surprised at your commentary in the February issue of *MT* concerning religious broadcasters and their tactics to dupe the masses out of money, etc. ... You seemed to have a problem with preachers who preach on the electronic medium and sometimes ask for money. We all know it takes bucks to be on TV or radio – AM/FM or shortwave.

"When I read your article, the thought that came to mind was that you are angry at men who are on the air begging for money. I hate that also. But with that statement comes the fuel for those who take any opportunity to further cut down any Christian or religious cause. Perhaps that was your intent. Perhaps not. I just found it strange that you diverted from your usual columns on radio and the hobby and came down on these folks. Personally, I don't care what size house anyone live in. Who are we to judge?

"I don't usually write to people with my comments. But I really respect you and thought that this one commentary was out of step with your usually great work. It didn't fit somehow and I wanted you to know that I am not on the religious right but I defend their right to exist and preach the gospel. If people want to send money into them so be it. I have no more right to try and stop that than someone does telling me not to buy the new HF gear in your catalog."

– Nick ? via email

"Hi, Nick, and thank you for taking the time to share your thoughts regarding my commentary. Oddly enough, yours was the only dissenting letter I received about it. ...You are correct in assuming that I distrust anyone who takes advantage of another person's faith to profiteer. I have seen so much crass commercialism in religion that I have become (perhaps overly) suspicious of religious broadcasting. At the turn of the millennium, I was astounded at the number of religious broadcasters cashing in on the trust of unsophisticated, believing listeners in order to make a last-minute, fast buck on Y2K fears.

"Upon re-reading my commentary, I feel that the point I made was that much of the pitch is being used to generate money for personal, not philosophical purposes. After all, if the preacher is living in a palatial mansion, perhaps we should take a closer look at his revenue generating scheme.

"The inspirational messages which may be heard on the airwaves serve to provide many downtrodden listeners with courage, motivation, and hope. In no way would I want to see this altruism curbed; we need more of it. But are there self-serving, profiteering religious broadcasters who prey on the trust of their listeners? Absolutely. And, are there also decent men and women who use the airwaves to propagate good and righteous ideals? Absolutely. My take on all of this is that we need more broadcasters who are religious, and fewer religious broadcasters."

– Bob Grove

Skip Arey reports: "I got to operate the original Tuna Tin II ! Here is a pic of me with Ed Hare W1RFI at the station. You can see the TT II sitting on top of the Ten Tec Omni we were using as the receiver. This occured at Atlanticon 2000 in Glen Mills, PA. We also used W1FB/3 as the callsign. Doug Demaw's call. I got goosebumps sending it. What a rush!"

Who's on Shortwave?

The following opinions were cut from Glenn Hauser's Global Forum column for lack of space, but they seem appropriate here:

"You wouldn't believe some of the nonsense spouted on 6890 USB, a channel mainly sold out to 'super patriot' groups. I was never quite sure what 'super patriot' actually meant, but it appears to be someone who is intolerant to pretty well every other race, religion and lifestyle, obsessed with 'outing' US governments past and present for alleged scandals and dishonesty, and trying to earn a few dollars by convincing as many as possible that either (a) there is an imminent nuclear strike or (b) there is a government conspiracy to strip Joe Public of his home and wealth, and using this to persuade them to invest in vitamin and food supplement tablets, tents, water purifiers and Grundig short wave radios (at least that's not such a bad thing).

"The 'severity' of these broadcasts varies; one of the more disturbing is Voice of Freedom, a neo-Nazi/anti-Semitic program of some organisation run by an Ernst Zündell. I had read of such programs, but only really got such an insight by chasing up an elusive WGTG QSL (WGTG stated that their current attitude to QSLing was that it would require an addressed envelope, $2 and 5 hours worth of programme details.) Anyone know actually how many Americans are caught up in these sentiments?

– Tom Read, UK, in BDXC-UK

"It seems that there are only religious organizations out there willing to take advantage of the far reaching power of shortwave broadcasting. I have tried so hard to get more alternative stuff but it's the same old story – a lot of

the free thinkers don't seem to have the time or the money to get on the air. Sometimes it is sad and discouraging. There are lots of angry voices on the radio today. Very few voices of love and peace willing to take to the airwaves. If I did not 'give away' a lot of my airtime as I do there would be very little alternative stuff on my airwaves. I shall keep trying."

– Allan Weiner, WBCQ, DX Listening Digest

MT – a Labor of Love

"I felt compelled to send this message to compliment you and your staff for the excellent, comprehensive monthly issues of *Monitoring Times*. I can't imagine how you manage to publish monthly issues, each one full of different cutting edge information. It's obvious that *Monitoring Times* is a labor of love of the highly technical world we live in today.

"We are going through the best and worst of times, and your knowledge woven into each issue keeps me afloat, always looking forward to receiving the next issue. My sincere thanks to you and your staff keeping everything so informative, and my thanks to the writers of articles, but especially your (Bob Grove's) writings in every issue."

– Don Paxton, via fax

Let's Hear More from South Pole

"I am prompted to write following January's Antarctic article by Chuck Kimball, full of detail plus photos. Although in New Zealand we are a few thousand miles closer to McMurdo, the nearest information center is down in Christchurch, in the South Island. Quite some way from here.

"May I now suggest you eventually compose a similar spread on the South Pole setup? There appears to be a dearth of info and pictures, particularly of the exterior. How about a decent aerial shot above the pole to give us some perspective?

"I understand that most radio comms are now made directly between McMurdo and Auckland although 'Deep Freeze' HQ is still at Christchurch Airport. Supply flights from Hickam to Christchurch via Pago Pago pass directly overhead here. All we see, however, are the contrails...

"In your list of frequencies, you show the French station Dumont d'Urville on 7450 HF, but a better 'catch' would be their transmissions on 11,576 and 14,971 (ARQ-E3 96/404), a quite unmistakable signal tone. All in French, of course, and sometimes up to six pages! Paris transmitting to Kergulen on 14438 also comes in well.

"Another project of interest to *MT* readers, if I may suggest, could be the US military presence on Okinawa with its very active airbase at Kadena and adjacent listening post at Sobe with giant antennas."

– Charles Chenery, Auckland, NZ

Thanks for the suggestions to our authors, Charles. Ironically, Chuck Kimball's article actually came about because an article on the South Pole had been scheduled, but didn't come through. We're still waiting! Anyone interested in writing the suggested article on Okinawa?

Send your "Letter to the Editor" to *Monitoring Times*, PO Box 98, Brasstown, NC 28904 or via email to *mteditor@grove-ent.com*.

Crises in County Communications

Counties all across the U.S. are struggling to find flexible, reliable, but affordable communications systems, so the story of Fauquier County, Virginia, could take place anywhere. There are a few quirks to this story that make it especially interesting, however.

It all started last fall when two rodents crawled into a cabinet and short-circuited some electronics, putting the fire and rescue system's base transmitter (for dispatching response to 911 calls) out of commission for five days.

From there it gets complicated. That transmitter stands in a "radio shack" at the Warrenton Training Center, a federal intelligence base. Permission to visit the shack for maintenance requires a background check from the Warrenton Training Center security staff. Technicians from the maintenance company had to wait three hours to gain access to the training center, according to the company president.

When the back-up system also failed and parts weren't available, one day grew into five. The new company responsible for maintenance could neither return the system to the air nor establish a working back-up. When the county finally turned to the old contractor for help, a stop-gap system was in place in less than two hours. (Guess who the sheriff wants back?)

The sheriff and other county officials have used the failures as confirmation that the county needs a new emergency radio system. Others point to multiple warnings of rodents at the site and the lax maintenance of the system.

"It's just part of the mentality," said Bill Weber, a Federal Aviation Administration air traffic systems specialist and retired volunteer fireman. "We take it easy till something happens. I mean, what does it take to pick up the trash and put the wires in a conduit? … They (county officials) say, 'Oh, your lives are valuable and we're gonna spend $8 million on a new radio system.' Well, is it not worth $10,000 to get the current system working (properly)?"

While the county officials wrangle, officials at the training center said they've called exterminators to take care of the rodent problem. Virginia State Police radio technicians also began improvements to the radio shack to make it secure for their own use. "We plan to improve it, harden it against lightning, seal it and improve it for everyone," according to state police Telecommunications Engineer John Agee. The county has committed to monthly checks of the backup system which also failed.

For two years, county officials have planned to replace Fauquier's aging and failure-prone emergency radio system with an 800-MHz network. The county has been awaiting FCC approval of the high-frequency radio channels for which it applied last year.

However, shocked by cost estimates for that system, Dr. David Collins hired a group of radio consultants at his expense to investigate other alternatives. They discovered that a less expensive system may now be feasible, due to newly available 150-MHz frequencies. The system could save the taxpayers 5 million or more.

"I'd like to see the county get a good emergency radio system that isn't prohibitively expensive," said Dr. Collins, the CEO of Learning Tree International Inc. "And, also one that didn't cause a lot of visual environmental pollution."

The planned 800-MHz system requires three to five new towers at heights of 250 to 350 feet. A 150-MHz system could use existing towers and would cost nearly 75 percent less, Dr. Collins' consultants contend.

Supporters of 800-MHz systems cite "interoperability" among that system's primary advantages. "Every other county that has gone through the (research) process has come up with 800 megahertz ... for very practical reasons," said FCC Region 20 Chairman Steve Souder.

Nonetheless, the Virginia State Police has begun a six-year project to construct a statewide 150-MHz emergency radio network. All state

Radio Honor Roll

Saved by a Scanner Listener

Where do you land when the lights are out? That's what four pilots were wondering to each other as they circled above the Kingman, Arizona, airport. Fortunately for them, their conversation was overheard by Kim McLaughlin who was listening to her scanner. She alerted her husband Ken, a Department of Public Safety officer, and he contacted the Department's Air Rescue Ranger unit. By using a helicopter and a spotlight to light the runway, all four planes landed safely.

Saved by a Ham

A Dutch family which has been sailing around the world for the past four years, encountered more adventure than they bargained for on April 7. Anchored among uninhabited islands off the coast of Honduras and Nicaragua, Jacco van Tuijl and his 13-year-old son Willem were returning in an inflatable dinghy from visiting a nearby boat. When an unknown vessel pulled alongside the van Tuijl's home-built yacht, Jannie van Tuijl assumed they were fishermen – until they pulled out assault rifles and boarded the boat. She screamed to warn her husband away. The pirates shot and sank the inflatable and wounded Willem. When the pirates fled, Jacco swam back to the boat, supporting the now-paralyzed Willem.

Amateur radio operators who picked up their distress call contacted the U.S. Coast Guard, who arranged for a rescue ship to be sent from Honduras. Hams gave the parents directions to the Honduran rescue ship and stayed on the air with them through the 20 hours it took to get Willem to a clinic in Honduras. In particular Dr. Jim Hirschman, a Miami physician and ham radio operator, guided them in treating the boy until they could get medical help. "If it weren't for them, Willem probably would have died," Jannie van Tuijl said.

It took 20 hours for the boy to reach a clinic in Honduras, from where he was later transferred to the Children's Medical Center in Dallas after several US hospitals refused to accept him because of fears about payment. Willem is paralyzed from the waist down because of the damage to the spine.

BULLETIN BOARD

June 4: Queens, NY

Hall of Science ARC Hamfest at the NY Hall of Science parking lot, Flushing Meadow Corona Park, 47-01 111th St, 9 a.m., adm $5 donation, talk-in 444.200, PL 136.5, 146.52 simplex. Free parking. VE exams. Contact Stephen Greenbaum WB2KDG at 718-898-5599 (night) *Wb2KDG@Bigfoot.com*

June 11: Bethpage, NY

Long Island Hamfair, sponsored by LIMARC, at Briarcliffe College, 1055 Stewart Avenue, Bethpage, NY 11714, 8:30a.m.-2p.m.; talk-in 146.850 (PL-136.5) Gen admission $6, under 12 free. Call 516-520-9311 for info or visit www.limarc.org.

June 11: Knoxville, TN

Knoxville Hamfest and Electronics Flea Market at National Guard Armory, 3330 Sutherland Ave 9a.m.-4p.m., Gen adm $6, talk-in 147.30+/2245.50-/444.575+. Food, exhibits, VE exams. Info: David Bower K4PZT VOL-670-1503 *rack@korrnet.org* or visit www.korrnet.org/rack

June 17: Houston, MO

Ozark Mt Repeater Group Ozark Hamfest at the Texas County Fairgrounds, 8a.m.-3p.m. Contact Willy Adey N0TPE:
n0tpewla@train.missouri.org
or call 573-674-2174

June 17: Dunellen, NJ

Raritan Valley Radio Club hamfest, Columbia Park, Routes 529 and 28, 7a.m.-2p.m., adm $5, talk-in 146.025/625, 447.250/442.250, PL 141.3, 146.520 simplex. Official DXCC and WAS verification, fleamarket, refreshments. Contact Doug Benner W2NJH, 732-469-9009 or *wb2njh@aol.com*

June 18: Monroe, MI

Monroe County RAC Hamfest 7:30a.m.-1p.m., Monroe County Fairgrounds, west of Monroe on M-50. Gen adm $6, talk-in 146.72. Contact Fred VanDaele KA8EBI, 4 Carl Dr, Monroe, MI 48162, 734-242-9487 after 5 pm. ka8ebi@arrl.net

agencies and some local law enforcement agencies can become part of the system.

No Perfect Solution

800 MHz systems have their own problems. In Anne Arundel County, Maryland, eight "dead zones," in which radio signals are weak or nonexistent, force police to turn to cellular phones for communications. Engineers and officials have concluded that, ironically, the problems stem from the presence of a cellular tower in each of those areas.

Although the cellular companies and the police are assigned different frequencies, they are extremely close together, and the stronger cellular signals essentially overpower police transmissions.

Several solutions are available, according to FCC engineers. In some cases, frequency coordinates can be adjusted slightly. But with the tremendous growth of the telecommunications industry, the bands are usually crowded. A new radio system with better filters is under consideration and has tested successfully in the dead zones. Initially, the chief said he was going to spend about $23,000 on cellular phones for officers patrolling the dead zones. But if the $22 million expenditure for a new system is approved, all radios would eventually be replaced with new models, which have analog and digital capability.

Anne Arundel is not the only Maryland county considering a radio upgrade. In Howard County, where police and firefighters also experience spotty radio service, officials are negotiating a $20 million to $30 million contract for a new system, said Alan Ferragamo, project manager. "It would remarkably improve our communication coverage throughout the county," he said.

The new system would cover about 95 percent of the county, said Ferragamo, which "is about as good as you can get with the technology these days."

In Baltimore County, police also report radio problems. "We have always had a few dead spots," said Cpl. Ronald H. Brooks. "Some are attributed to cell towers. Some of it's geographical."

A police sergeant in Atlanta, Georgia, has filed a grievance with the Police Department because the radio system is unreliable, due to numerous dead zones. The city has agreed to add a bi-directional antenna to boost the signal in one problem area, but the commander of the communications unit says no communications system can completely eradicate dead zones caused by ditches, buildings, and other uneven terrain.

Portishead Radio GKA Gone

BT Maritime Radio Services announced that reknowned Portishead Radio and all of the VHF stations would close at 1200 UTC on Sunday 30 April. The mediumwave stations will close at 1200 UTC on Friday 30 June.

Portishead Radio first came on air 80 years ago in 1920 and became the largest communications center in the world. It employed over 340 people and was the CW and radioteletype center for the Commonwealth.

Congress Moving to Block LPFM

With massive persuasion from the National Association of Broadcasters, the House passed H.R.3439, a bill introduced by Sen Oxley which would require the FCC to revise its new low-power FM station licensing program. The new Radio Broadcasting Preservation Act of 2000 grants channel separation to avoid interference – a move which would reduce potential LPFM stations by 80%. It also prohibits any person who has operated an unlicensed station from being granted a low-power FM license. Commerce Committee Tom Bliley said, "I am extremely disappointed that the issue of LPFM has reached a point where Congress must step in and legislate in order to prevent the issuance of low power FM broadcast licenses by the FCC."

Meanwhile, the Big Get Bigger

Clear Channel, in its purchase of rival AMFM Inc, is now the number one US radio company, owning 867 radio stations. The merger forced San Antonio-based Clear Channel to sell or trade 72 of its stations to other consortiums, since the acquisition put the number of stations owned by Clear Channels over that allowed by the FCC in one market. Clear Channel also plans to purchase SFX Entertainment, Inc, a major promoter of live events.

Number two in the nation is Cumulus Media Inc out of Milwaukee. Its purchase of 35 midwest stations puts the number of stations owned to 299. The majority of its stations, however, are in small towns; the company's revenue is only the sixth largest in the nation.

Art Bell Quits Radio

"I have decided to retire from the broadcast business at the end of this month, my last show to be April 26, 2000," long-time radio host Art Bell announced March 31. It was no April Fool joke: Bell has been broadcasting under great stress since the kidnap and rape of his son in 1997, and accusations made only a few months later that he himself was a child molestor. The accusations were made on shortwave station WWCR in Nashville, Tennessee.

Bell blasted the station, saying, "This station has been described by newpapers and civic minded organizations as one of the country's leading broadcasters of hate radio."

"In addition to broadcasting these proponents of hate and violence, this radio station has consciously decided not to spend money on a delay switch, not to conduct a careful background check of the people it places on the air and to allow individuals to say almost anything they want in foreign languages without having staff on duty who can even understand what they are saying.

"In my opinion, WWCR is one of the most irresponsible stations permitted to broadcast over the airwaves of this country."

Bell said he could no longer give his best as a radio personality and he looked forward to becoming a private citizen. "The reality that after suffering the fate of my son's own molestation, I now stand destined to be tainted for life as a child molester, has proven simply too much to bear."

"Communications" is compiled by Rachel Baughn from newspaper and email clippings sent in by our readers. This month's contributors are Anonymous, CT; Anonymous, New York; Louis Johnson, Doraville, GA; Gerald Kercher, Quaker Hill, CT; Kevin Klein, Neenah, WI; Jim MacDonald, Derry, NH; Doug Robertson, Poxnard, CA. Via email: Harley Bogart Jr, Patrick Downer, Warren Eggers, John Figliozzi, Nigel Holmes, Chuck Porter, Rhia Siegle, Doug Smith, Larry Van Horn, Jay Wilson, Robt Wyman

Antique Radios and Fresh Fruit

Jasper's Antique Radio Museum in St. Louis

Story and photos by Bob Tarte

Despite the vacuum tube atmosphere and falling ceiling plaster, a visit to Jasper's Antique Radio Museum is a bit like playing a computer game. If you follow certain protocols, you ascend to the next level – or may even earn a trip to the basement. But if Jasper Giardina doesn't take to you, don't expect to get into all the hidden rooms, much less make it past his locked front door on St. Louis' Antique Row.

It's wise to call ahead and tell Jasper you're coming, but unwise to trust the state's *Official Missouri Travel Guide*, which listed Jasper's address as 20-22 Cherokee Street. That hyphen's a real killer. The desolate first block of Cherokee dead-ends at the Mississippi River, and as my friend Bill Holm turned the car around, a woman appeared from nowhere and insisted we drive her out of there because "that guy in the pick-up truck is going to shoot me." Against our better judgment, we caved in, only to find ourselves ominously behind the pick-up a few blocks later. Fortunately, it veered off in another direction. In lieu of any thanks, the woman whose bacon we purportedly saved told us how to find 2022 Cherokee just before hitting the sidewalk.

Jasper Giardina and a just-restored 1936 General Radio and Television Corporation AM-radio that erroneously claimed to be "compatible with TV."

❖ Not Your Ordinary Museum

Jasper's isn't your ordinary museum. For one thing, many of the 10,000 radios crammed into the corner storefront he shares with his thriving fruit basket business ("I invented the fruit basket over 50 years ago," he claims) are for sale as long as you meet his asking price. "I won't haggle," he told us. "I haven't gone to all this trouble for that." And he has well-heeled customers like Bill Murray and Richard Simmons to prove it.

It's also not a museum that permits great leisure to sort out the visual overload. Jasper's floor-to-ceiling shelves are packed with a mind-numbing array of crystal sets, breadboards, tombstones, early superhets, Bakelite kitchen radios, wooden table radios, furniture-grade consoles, the first tube and transistor portables, novelty radios, coin-operated radios, a few shortwaves and military models, plus Catalin and Plaskon units priced into the ionosphere by collectors who covet the bright, pre-plastic colors and deco styling.

The claustrophobia is formidable, and with gruff friendliness Jasper is right there at your side to usher you through the door into yet another daunting room as long as he gauges your interest is genuine. But if you're a denizen of the deteriorating Antique Row neighborhood (a few blocks south of the Anheuser-Busch brewery) with no obvious

French-made Jesse miniature console from the 1930s — probably one of the only two left in the world

passion for wireless sets or a hankering for a fruit basket, the bolted front of the shop is as far as you'll get.

And who can blame him for his vigilance? Unaccompanied guests have stolen the dial hoods from some of his oldest sets – though their value pales beside a lavender Egyptian Air King #52 molded plastic beauty from 1933 conservatively valued at $10,000.

❖ Oddities and Rarities

The Air King shares its one-of-a-kind status with countless other rarities, including a gorgeous French-made Jesse Miniature Console from the 1930s with the look of an antique armoire. "As far as I know, there is only one more of those in the world," Jasper explained. "I tried to locate the guy who bought it out of an estate sale, so we could compare notes on it, but I didn't have any luck... Radios like this one that are really rare pieces were owned by people who really took care of them. You can walk up and down the aisles and probably pick out other radios owned by the same guy, because he kept them in such good condition."

One of Jasper's latest restorations was an oddball radio resembling a snare drum made by General Radio and Television Corporation in 1936 – a product of the days when the new medium of television was just beginning to breathe down AM-broadcasting's collective necks.

"Radio was so competitive in those days, they put attachments on console radios and said they were compatible with TV," Jasper told me. But despite the vaguely futuristic styling and tilt-adjustable stand, the General Radio set had nothing whatsoever to do with television. "It didn't mean a thing, there wasn't anything there. They all knew they had to look forward to TV, and everyone was using that as a sales pitch."

Generous with his information and his radios alike, Jasper is an antique radio evangelist who has been known to give a "starter" radio to newcomers to the hobby, especially kids. When I watched him fiddle with an old Atwater-Kent, tweaking the three front panel dials until he finally pulled in a local St. Louis station playing Simon and Garfunkel's "Bridge Over Troubled Water," I suggested that finding the desired frequency on the fussy regenerative sets took a while.

"Too bad they don't take that long any more. Kids would be better off if they spent more time with radios," he told me – a telling comment considering that the Littleton, Colorado, shootings had just occurred.

"Do you have time to see the upstairs?" he asked. We'd come all the way from Michigan, so why not? I was eager to discover what other oddities lay hidden, and after our near-death experience earlier that morning, it felt good to get as far from street level as possible. On the top floor, Jasper pointed out what first appeared to be a collection of full-size grandfather and grandmother clocks. A closer examination revealed that the manufacturers had carefully incorporated an AM receiver into each cabinet, thereby creating the first clock radios. But don't try putting them on

Bartle or James presides over the country and gospel music archives of now-defunct KXLW-AM. Wire-service teletype is to the right of station clock.

Photo by Bill Holm

Jasper and the author in one of the museum's many rooms.

Photo by Bill Holm

Early "clock radios," cathedrals and more in an upstairs room

your bedstand.

"You probably won't find these anywhere except in the hands of collectors," said Jasper. "A lot of companies made them in the '30s – Atwater-Kent, Crosley, Philco, Radiola, General Electric. They tried a lot of things, and if they didn't go over, they shut it down quickly. They didn't flood the market with the things people didn't accept."

Other innovations that went nowhere included a German portable record player and AM radio combo from the '50s with tuning dial cleverly encircling the turntable, and the wall-hung Futura sets with innards concealed in a picture frame and available in three different faux oil painting "face-plates" for that Eisenhower-era bachelor pad decorating touch.

❖ A Peek in the Basement

After shepherding us into a room devoted to wind-up 78 rpm phonographs, Jasper led up past the bathroom with his underwear draped on the shower stall door, a full-size kitchen with microwave, and a recently slept-in couch, signs of his tireless dedication to restoring and preserving his radios. "When they're gone, there won't be any others," he's fond of saying.

Back downstairs, we had a quick glance at a storage area packed with plastic-body novelty sets and a peek inside the walk-in refrigerator where he keeps the produce for his tropical fruit baskets. We then concluded the tour with a visit to the basement containing a studio mock-up of defunct St. Louis broadcaster KXLW-AM complete with the station inventory of country and gospel 45s, AP wire service teletype, and announcer's microphone manned by a life-size cardboard cut-out of Bartle or James.

The basement held secrets even Jasper forgot were there. "I didn't know I had one of these," he muttered as he poked through a pile of radios awaiting restoration stacked against a wall in the corner. "It's a nice surprise," he smiled, as he bent over the pile.

Sharing space with Jasper's radios in his crowded quarters are antique cash registers, an old whiskey still, an early telephone switchboard, NASCAR collectibles, first-generation televisions, radio memorabilia, fruit basket promos and paraphernalia, and photo after photo of the celebrities who have visited the museum since it opened in the mid-1980s. These include movie stars, St. Louis Cardinals team members, Rams football players and cheerleaders, sports figures such as Tommy Lasorda, Congressman Dick Gephardt and other national politicians, Regis Philbin and other TV luminaries, radio personalities, and stock car drivers.

Some celebrities, like Richard Simmons, stop by to try and purchase the same model radio that they grew up with in their home, though Jay Leno had his eye on an early model car radio to fit on the steering wheel of one of his vintage autos. Bill Murray, who coveted one of Jasper's tombstone sets, even shot scenes for his white-elephant movie "Larger Than Life" in the museum. According to Jasper, two pachyderms were "Federal Expressed" to Antique Row for the film: starring-elephant Vera and a double to keep her company. Publicity from the movie along with frequent write-ups in local publications and antique trade magazines keep visitors coming Jasper's way.

"I've had backers who wanted to put up money and put all this in a new building," Jasper told us – and the crumbling flea market setting does constitute a humble home for what may indeed be largest collection of antique radios in the world. But he never even considered the offer of a more upscale museum.

"This is Jasper," he said matter-of-factly, "cracked ceiling plaster and all."

Jasper's Antique Radio Museum

2022 Cherokee Street
St. Louis, MO 63118
(314) 421-8313
Open Monday-Saturday 9:00 am-4:00 pm, Sundays
"by appointment or chance"
Museum Admission: $2.00 per person donation goes to Boy Scouts of America

About the Author:

Bob Tarte writes a world music CD column for *The Beat* - **www.technobeat.com**. He is the author of the February feature *Using Music to ID SW Stations*.

Novelty radios, NASCAR memorabilia and an early TV

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Alinco battery case, 4 "AA"	BAT 22	$9.95
Alinco, car lighter cable w/filter	DCC 14	$23.95
Alinco DJ-X10T soft case	CAS 19	$12.95
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HF Communications in the New Millennium

Monitoring the US Government ALE Systems

By Larry Van Horn

The shortwave radio spectrum is a dynamic medium, one that puts a lot of demands on anyone choosing to operate in that portion of the radio spectrum. One of the main problems that operations in the shortwave spectrum have to deal with is the constant change in HF propagation. Selecting the right frequency on which to work another station in a net or radio system covering a 28 MHz expanse of radio frequencies can be a challenge.

However, the computer age has changed the equation dramatically. Using the computer and specialized software, HF radio operators now let their PC do the walking through the radio spectrum to determine the right frequency to work a particular station in their network.

This new computer based system is known as ALE or automatic link establishment, and it has brought HF communications forward into the 21st century.

As the former *Utility World* column editor for *Monitoring Times* I have been fortunate to watch changes to the HF utility bands from a front row seat over the last decade. The turnaround has been nothing short of remarkable. The major force that has brought renewed U.S. government interest in the HF spectrum has been the introduction of ALE systems.

How the ALE system works is quite fascinating, but it is outside the scope of this article. If you want more information on ALE, look no further than the *Utility World* columns in this and the March issues of *MT*. You will also find an excellent write-up by Richard Lacroix on the internet at **http://webhome.globalserve.net/rlacroix/modems/ale.html**. Additional information is available at *UW* columnist Hugh Stegman's website: **www.ominous-valve.com/uteworld.html.** Jim Dunnett's write-up on ALE and the utility monitor can be viewed at the WUN (Worldwide Ute News) website: **www.wunclub.com/files/aleinfo.html.**

Finally, if you want to get into the action of ALE monitoring, you can get the necessary software for the PC at Charles Brain's website: **http://www.chbrain.dircon.co.uk.** It's free!

Department of Defense and Scope Command

The largest ALE systems the monitor will encounter on HF belong to the Department of Defense (DoD). Of these DoD systems identified thus far, the US Air Force Scope Command (see this month's *Utility World* column) system is the largest in terms of frequencies and users. Here is a synopsis: Net frequencies: 2805 3059 3137 4721 5708 6715 6721 7632 8965 9025 9057 11226 11250 13215 15043 18003 20631 23337 27870 kHz

Major ground stations in this network:

ADW	Andrews AFB, Maryland
AED	Elmendorf AFB, Alaska
ASC	Ascension Island
CRO	Croughton AB, England
GTL	Thule AB, Greenland
GUA	Andersen AB, Guam
HAW	Ascension Island
HIK	Hickam AFB, Hawaii
JDG	Diego Garcia
JNR	Salinas/Roosevelt Roads, Puerto Rico
JTY	Yokota AB, Japan
LOU	Louisville IAP, Kentucky
MCC	McClellan AFB, California (West Coast)
OFF	Offutt AFB, Nebraska
PLA	Lajes AB, Azores
RIC	Richmond, Virginia (CAP National Technology Center)
RSC	Dallas, Texas (Rockwell Scope Command Facility)
WRL	Robins AFB, Georgia (Warner Robins Air Logistics Center)

Aircraft and mobiles on the Scope Command nets may use up to a six character address, but you will also encounter some three digit aircraft identifications. Below are some of the more interesting Air Force aircraft that have been observed on this HF system recently.

AF2	Air Force Two (U.S. Vice President's aircraft)
AF5	Air Force Tail No 50049 (SAM 049 C-20C 85-0049 89AW Andrews AFB, MD)
AF6	Air Force Tail No 50050 (SAM 050 C-20C 85-0050 89AW Andrews AFB, MD)
AF7	Air Force Tail No 60403 (SAM 403 C-20H 86-0403 Selcal AF-DP 89 AW Andrews AFB, MD)
AF8	Air Force Tail No 28000 (SAM 28000 VC-25A 82-8000 Selcal AE-FP 89 AW Andrews AFB, MD)
AF9	Air Force Tail No 29000 (SAM 29000 VC-25A 82-9000 Selcal AE-MP 89 AW Andrews AFB, MD)
C01	Casey 01 (KC-135A 57-2589 assigned to USSTRATCOM commander, belongs to 55 RW at Offutt AFB, NE)
GS1	Sentry 30 (AWACS aircraft, probably not a permanent assignment)
NW1 – NW4	E-4B National Airborne Operations Center (NAOC) command aircraft
S99/699	Speckled Trout (C-135C 412FTS)
UK (n)	Royal Air Force Aircraft (UK followed by a single digit)

There are some basic rules for ALE addresses that apply to other Air Force aircraft that use the Scope Command system. Most of the aircraft using the system can be recognized by their six digit only ALE addresses. The first element of the ALE address identifies aircraft type as follows: 1 C-5, 2 C-17, 3 C-141, 4 KC-10, 5 KC-135, 6 C-9, 7/8/9 are reserved for later use, 0 all other types. Second element is the last digit of the year of manufacture (i.e. aircraft manufactured in 1978 or 1988 would use the number 8). The third through sixth elementa are the last four digits of the aircraft tail number.

Here are some other military ALE addresses noted recently on Air Force HF Nets.

16F	USAF	Hurlburt AFB, FL (16 SOW)
16T	USAF	Hurlburt AFB, FL (16 OSS)
23A-23U	USAF	Charleston AFB, SC (23 CCS)
352	USAF	RAF Mildenhall, UK (352 SOG)
353	USAF	Kadena AB, Japan (353 SOG)
459	USAF	Andrews AFB, MD (459 AW AFRES)
51T	USAF	Robins AFB, GA (51 CCS)
52T	USAF	Robins AFB, GA (52 CCS)
53T	USAF	Robins AFB, GA (53 CCS)
66A-66U	USAF	McChord AFB, WA (66 CCS)
ADR	USAF	Andrews AFB, MD (Unknown AMC unit)
AF1	USAF	Pentagon, VA (Headquarters USAF)
ALT	USAF	Travis AFB, CA (Alternate TACC)
AMA	CAP	Amarillo, TX (Region 6 SWR)

AMC	USAF	Scott AFB, IL (TACC)
AZR	USAF	Lajes AB, Azores (65 SW)
BAY	USA	Bayonne, NJ (Global Augment Facility-probably closed now)
BCR	DoD	Washington, DC (National Security Emergency Preparedness)
BDF	Civilian	Bedford, MA (MITRE Corporation)
BED	USAF	Hanscom AFB, MA (Rome Lab)
BLV	USAF	Scott AFB, IL (375 AW)
CEF	USAF	Westover AFB, MA (439 AW)
CHS	USAF	Charleston AFB, SC (437 AW)
CWF/CWT	USAF	Hurlburt AFB, FL (Combat Weather Fac.)
DAF	USAF	Rhein-Main AB, Germany (362 ALSG)
DAR	USAF	Ramstein AB, Germany (608 ALSG)
DOV	USAF	Dover AFB, DE (436 AW)
DWC	Civilian	Escondido, CA (Datron Corp/Tranworld)
DYS	USAF	Dyess AFB, TX (7th WG)
EDW	USAF	Edwards AFB, CA
ERT	USN	NS Rota, Spain
FBI	FBI	Quantico, VA
FCS	USAF	Ft. Carson, CO (TACCS Training Net)
FDN	CAP	Friendens, PA (Region 1 NER)
FFO	USAF	Wright Patterson AFB, OH (907 ALG)
FMA	USAF	Scott AFB, IL (Air Force Frequency Management Agency)
GFA	USAF	Malmstrom AFB, MT (43 ARW)
GRF	USA	Ft. Lewis, WA
GUN	USAF	RAF Mildenhall, UK (313 AG)
GUS	USAF	Grissom AFB, IN (434 ARW)
GVT	Civilian	Greenville, TX (E-Systems Test Facility)
HNL	USAF	Hickam AFB, HI (619 ALSG)
HOG	USAF	Maui, HI (292 CBCS ANG)
HRT	USAF	Hurlburt AFB, FL
HTO	USAF	Hilo, HI (ANG)
HWD	CAP	Hayward, CA (Region 8 PACR)
IAB	USAF	McConnell AFB, KS (384 ARW)
IAD	Civilian	Reston, VA (MITRE Corp)
ICZ	USN	NAS Sigonella, IT
JAN	USAF	AC Thompson Field, MS (172 AG)
JTC	USAF	Washington, DC (Joint Interoperability Test Command)
JTF	USAF	Washington, DC (Joint Interoperability Test Command/DISA)
KSO	USAF	Osan AB, South Korea (611 ALSS)
LFI	USAF	Langley AFB, VA
LRF	USAF	Little Rock AFB, AR (314 AW)
LUF	USAF	Hill AFB, UT
MAC	Civilian	Raleigh, NC (MacKay Radio, Inc.)
MDC	Civilian	Long Bch, CA (McDonnell Douglas)
MLB	Civilian	Melbourne, FL (Grumman)
MXF	CAP	Maxwell AFB, AL (Region 4 SER)
NCA	USMC	MCAS Camp Lejuene, NC
NCC	DISA	Washington, DC (National Coordinating Center/DISA)
NKT	USMC	MCAS Cherry Point, NC
NLX	USN	Portsmouth, VA (NISE East)
NOR	Civilian	Norfolk, MA (MITRE Corp)
NYG	USMC	MCAF Quantico, VA
ODN	USAF	Kadena AB, Japan (603 ALSG)
OKC	USAF	Tinker AFB, OK (Unknown local unit)
OKV	CAP	Winchester, VA
ORF	USN	Norfolk, VA
PBG	USAF	Plattsburgh AB, NY
PDX	CAP	Portland, OR (Region 8 PACR)
PHO	USAF	Howard AB, Panama (Now probably closed: 617 ALSS)
PKS	USAF	Unknown
POB	USAF	Pope AFB, NC (23 WG)
RDR	USAF	Grand Forks AFB, ND (319 ARW)
RGT	Civilian	Cedar Rapids, IA (Rockwell Test Station-Proofing/Verification)
RIV	USAF	March ARB, CA (22 ARW)
RME	USAF	Rome, NY (Rome Lab)
RMW	Civilian	Dallas, TX (Rockwell Media Facility)
ROC	Civilian	Cedar Rapids, IA (Rockwell unmanned facility-24 hour monitor)
RST	Civilian	Rochester, NY (Harris Radio, Inc.)
SKA	USAF	Fairchild AFB, WA (92 ARW)
SKF	USAF	Kelly AFB, TX (433 AW)
SUU	USAF	Travis AFB, CA (60 AW)
SUX	CAP	Sioux City, IA (Region 5 NCR)
SWF	USAF	Stewart AFB, NY (105 AG)
T52	USAF	RAF Mildenhall, UK (352 OSS)
T53	USAF	Kadena AB, Japan (353 OSS)
TAF	USAF	Incirlik AB, Turkey (628 ALSS)
TAG	USAF	Incirlik AB, Turkey (Unknown local unit)
TCM	USAF	McChord AFB, WA (62 AW)
TIK	USAF	Tinker AFB, OK (Unknown local unit)
TWS	USAF	Lajes AB, AZR (Unknown local unit)
VXO	USAF	Vaxjo, Sweden (Sweden Test Station)
WRB	USAF	Robins AFB, GA (AMC)
WRI	USAF	McGuire AFB, NJ (438 AW)

We have been told by several individuals close to the program that several addresses have been reserved. Some of these include:

AND	USAF	Andersen AFB, Guam (Reserved)
DGA	USN	Diego Garcia (Reserved)
ELM	USAF	Elmendorf AFB, AK (Reserved)
HAF	USAF	Washington, DC (HQ USAF/Reserved)
HIC	USAF	Hickam AFB, HI (Reserved)
HMS	RN	Her Majesties Ship (Reserved for anticipated testing)
INC	USAF	Incirlik AB, Turkey (Reserved)
NCS	USAF	Andrews AFB, MD (Reserved Mystic Star)
PAN	USAF	(Reserved-Not Assigned)
WXB	USAF	(Reserved-Not Assigned)

And as with any HF military system I have a large list of unknowns. Any help from our readers would be greatly appreciated. Scope Command unknowns include:

Lots of three digit number which are probably aircraft:
0VG 80T 9PP A1A ADW061 AG6 AGD B2W BSE BUZ C7J CBH CRG CTO DQBP DVC E50 EIA FEF50 GAV GTA HEKM JAR JOZ JYU LGI M3 MB MI2 MMG MYC OFFOGW OFF600 P9G PKS SK3 ST1 TCM600 WB8 WM1 XAD YKG Z30

Army Corps of Engineers

Another organization that has had a large presence on HF over the years is the U.S. Army Corps of Engineers. The Corps is the U.S. Army's property manager. They perform all activities associated with real property management and civil engineering, research, development, planning, construction, and maintenance related to waterways. They also assist other agencies in recovering from certain natural disasters.

The Corps has used a well documented HF system for many years now. Those frequencies include (channel numbers in parenthesis): 3345 (1), 5015 (2), 5327.5 (3), 5400 (4), 5437.5 (5), 6020 (6), 6785 (7), 9122.5 (8), 11693.5 (9), 12070 (10), 12122 (11), 16077 (12), 16326 (13), 16358 (14), and 20659 (15) kHz. Two other frequencies (12267 and 16382 kHz) have been identified carrying Army Corps ALE activity. It is not known how these two frequencies fit into the rest of the system or their channel numbers, if any.

While not all the HF ALE players have been identified in this net, the list that follows is the most significant ever published.

2613	Unknown	Hendersonville, TN
CE2611	Unknown	Albuquerque, NM
CEPOAHF1	Pacific Ocean Division	Anchorage, AK
CGQ	COE HQ	Unknown
CGQHF1	COE HQ	Washington, DC
CRLHF1	Construction Engineering Research Lab	Champaign, IL
L22	Unknown	Unknown
L30	Unknown	Unknown
LRB	Buffalo District	Unknown
LRBHF1	Buffalo District	Buffalo, NY
LRBHF2	Buffalo District	Unknown
LRCHF1	Chicago District	Chicago, IL
LRD	Great Lakes and Ohio River Division	Unknown
LRDHF1	Great Lakes and Ohio River Division	Cincinnati, OH
LRE	Detroit District	Unknown
LREHF1	Detroit District	Detroit, MI
LRHHF1	Huntington District	Huntington, WV
LRL	Louisville District	Unknown
LRLHF1	Louisville District	Louisville, KY
LRNHF1	Nashville District	Nashville, TN
LRO	Ohio River Region?	Unknown
LRP	Pittsburgh District	Unknown
LRPHF1	Pittsburgh District	Pittsburgh, PA
MVD	Mississippi Valley Division	Unknown
MVDHF1	Mississippi Valley Division	Vicksburg, MS
MVDHF313	Mississippi Valley Division	Unknown
MVS	St. Louis District	St. Louis, MO
MVSHF1	St. Louis District	St. Louis, MO
MVT	Unknown	Unknown
NADHF1	North Atlantic Division	New York, NY
NAOHF1	Norfolk District	Norfolk, VA
NAP	Philadelphia District	Unknown
NAPHF1	Philadelphia District	Philadelphia, PA
NAPHF3	Philadelphia District	Unknown
NAPHF4	Philadelphia District	Unknown
NAPHF5	Philadelphia District	Unknown
NAPHF6	Philadelphia District	Unknown
NAPHN	Philadelphia District	Unknown
NVPHF1	St. Paul District	St. Paul, MN
NWK	Kansas City District	Kansas City, MO
NWKHF1	Kansas City District	Kansas City, MO
NWO	Omaha District	Unknown
NWOFP	Omaha District	Unknown
NWOHF1	Omaha District	Omaha, NE
NWP	Portland District	Unknown
NWPHF0	Portland District	Portland, OR
NWPHF1	Portland District	Portland, OR
RDTAR	Unknown	Unknown
RDTEF	Unknown	Unknown
RPK	Unknown	Unknown
RRVHF	Unknown	Unknown
SACHF1	Charleston District	Charleston, SC
SADHF1	South Atlantic Division	Atlanta, GA
SAMHF1	Mobile District	Mobile, AL
SASHF1	Savannah District	Savannah, GA
SASHF3	Savannah District	Unknown
SAWHF1	Wilmington District	Wilmington, NC
SBVHF1	Unknown	Unknown
SPA	Albuquerque District	Unknown
SPA STC	Albuquerque District	Unknown
SPAHF1	Albuquerque District	Albuquerque, NM
SPK	Sacramento District	Unknown
SPKHF1	Sacramento District	Sacramento, CA
SWF	Southwestern Division	Unknown
SWFHF1	Southwestern Division	Fort Worth, TX
SWG	Galveston District	Unknown
SWGHF1	Galveston District	Galveston, TX
SWT	Tulsa District	Unknown
SWTHF1	Tulsa District	Tulsa, OK
TSX	Unknown	Unknown
WUM	Unknown	Unknown
WWUP	Unknown	Vicksburg, MS

Other Army Nets

Another interesting US Army net apparently involves special operations forces from the 160th Special Operations Air Regiment (SOAR). There are only three frequencies currently associated with this net which includes ground stations at Fort Campbell, Hunter AAF, and possibly Fort Rucker in Alabama. Net frequencies discovered thus far: 5126, 9145 and 12068.5 kHz

Ground Station Callsigns

CLH	Hunter AAF, GA
CLS	Ft. Campbell, KY
DKB	Unknown
GRB	Ft. Rucker AAF, AL? (This is possibly the Ghost Rider Base voice callsign commonly heard on this net)
J8H290	Unknown
L26	Unknown

Aircraft Callsigns

D24118	Helicopter	MH-47D
D24360	Helicopter	MH-47D
E20471	Helicopter	MH-47E
E20474	Helicopter	MH-47E
E80267	Helicopter	MH-47E
K26378	Helicopter	MH-60K
L26184	Helicopter	MH-60L Black Hawk
L26185	Helicopter	MH-60L Black Hawk
L26189	Helicopter	MH-60L Black Hawk
L26290	Helicopter	MH-60L Black Hawk
L26363	Helicopter	MH-60L Black Hawk
L26365	Helicopter	MH-60L Black Hawk
L26366	Helicopter	MH-60L Black Hawk
L26419	Helicopter	MH-60L Black Hawk
L26457	Helicopter	UH-60L Black Hawk?

Another interesting ALE net is also sharing the 5126/9145 kHz frequencies mentioned above. This appears to be some sort of medical communications net. Stations identified in this net include:

U.S. Army - DoD photo by Senior Airman Jeffrey Allen, U.S. Air Force.

147COMMO	Marine Corps?	Possible Ft. Bragg, NC
44MED	Marine Corps/44th Medical Brigade Fort Bragg, NC	
520TAML	Army/520th Theater Army Medical Lab Aberdeen Proving Grounds, MD	
55MED	Marine Corps/55th Medical Group Ft. Bragg, NC	
6TMMMC	Army/6th Theater Medical Material Management Center Ft. Detrick, MD	

National Guard Bureau of Nets

There are also a large variety of National Guard frequencies with an even larger variety of ALE addresses, most of which have not been positively identified. Look for National Guard Bureau (NGB) ALE operations on the following frequencies:

2309 2360 2520 2627 3032 3170 3274 4442 4445 4517 4536 4607 4637 4776 4857 4924.5 4957 5062 5126 5202 5203.5 5217 5232 5299.5 5324.5 5429 5770 5777 5817 5847 5877 6047 6766 6910 7648.5 8037 8047 8054.5 8093 8157 9067 9121 9141 9141.5 9143 10233.5 10796 10816.5 12057 12087 14653 kHz

Known stations in network:

AME	Augusta, ME	NGB30
ANN	Annville, PA	NGB49
APA	Annville, PA	NGB49
AUS	Austin, TX	NGB55
BEIGHTLER	Beightler Armory, OH	
BJC	Jefferson Co Airport, CO	
BNA	Nashville, TN	NGB54
CMH	Port Columbus Intl, OH	NGB46
CON	Concord, NH	NGB40
CRI	Cranston, RI	NGB51
CRW	Charlestown Yeager Airport, WV	NGB61
CUB	Columbia, SC	NGB52
CYS	Cheyenne, WY	NGB63
DUT	Draper, UT	NGB56
HQ1NGB	Arlington, VA	NGB HQ/NGB01
HQ2NGB	Andrews AFB, MD	NG HQ/NGB02
HQ3NGB	Crystal City, VA	ANG HQ/NGB03
IND	Indianapolis, IN	NGB25
JEF	Jefferson City, MO	NGB36
JMS	Jackson, MS	NGB35
JON	Johnston, IA	NGB26
JSJ	Muniz ANGB, PR	NGB50
KYEOC	Frankfurt, KY	NGB28
LAT	Latham, NY	NGB43
LIT	Little Rock, AR	NGB13
LNK	Lincoln, NE	NGB38
MFD	Milford, MA	NGB32
MGE	Atlanta, GA	NGB20
MGM	Montgomery, AL	NGB10
MHR	Sacramento Mather Airport, CA	NGB14
MMA	Montgomery, AL	Tentative-NGB10
MWI	Madison, WI	NGB62
NGB43	Latham, NY	NGB43
NTM	Baltimore, MD	NGB31
RAP	Rapid City, SD	NGB53
RDU	Raleigh, NC	NGB44
RNO	Reno-Tahoe Airport, NV	
RVA	Richmond, VA	NGB58
SAF	Santa Fe, NM	Tentative-NGB42
SFL	St. Augustine, FL	NGB19
SLE	Salem, OR	Tentative-NGB48

Garry Watts

SOR	Salem, OR	NGB48
SPRINGFIELD	Springfield, OH	
STA	St. Augustine, FL	NGB19
STP	St. Paul Holman Field, MN	NGB34
TOP	Topeka, KS	NGB27
TTN	Trenton Mercer Airport, NJ	NGB41
UMP	Indianapolis Metro Airport, IN	
WDC	Washington, DC	NGB18
WDE	Wilmington, DE	NGB17

Some of the unidentified ALE addresses in the NGB nets include a variety of two, three and four digit numbers (which could possibly indicate a unit number?):
60 / 100 / 101 / 126 / 165 / 173 / 570 / 640 / 724 / 1001 / 1002 / 1261 / 1731 / 3201 / 5701 / 6321 / 6401 / 7241

Other unknowns include: 75TH / 198TH / A1J / A9A / APACHE / B1N / B2W / FFT / HLN / HLN HHL / HLND HLN / HQ1 / L4 / MARMOL / MB / Q5G / RTI / S2E / S60 / SRT / STN / TWC / TWC1 / WIN / Y1B

Law Enforcement

The US military is not the only user of the ALE system. Federal law enforcement agencies also have a large presence on HF. The FBI/Justice Department has one of the largest nets on these frequencies.

Frequencies: 2808.5 4991 5058.5 5388.5 9183.5 9311.5 10498.5 10913.5 11073.5 15953.5 18171 18666 20348.5 23402.5

Stations monitored in the FBI HF point-to-point net include:

AL1	FBI	Albany, NY	KEC 67
AN1	FBI	Anchorage, AK	KWX 20
AQ1	FBI	Albuquerque, NM	KKJ 67
AT1	FBI	Atlanta, GA	KIG 67
BA1	FBI	Baltimore, MD	KGD 83
BF1	FBI	Buffalo, NY	KEC 71
BH1	FBI	Birmingham, AL	KIG 73
BS1	FBI	Boston, MA	KCC 61
C33	Unknown		
CE1	FBI	Charlotte, NC	KIG 81
CG1	FBI	Chicago, IL	KSD 61
CI1	FBI	Cincinnati, OH	KQC 67
CL1	FBI	Cleveland, OH	KQC 77
CO1	FBI	Columbia, SC	KII 50
CQ2	Unknown		
CV1	Cleveland, OH		KQC 77
DE1	FBI	Detroit, MI	KQC 87
DL1	FBI	Dallas, TX	KKI 68
DN1	FBI	Denver, CO	KAG 69
EP1	FBI	El Paso, TX	KKI 73
HN1	FBI	Honolulu, HI	KUR 20
HN2	FBI	Honolulu, HI	KUR 27
HO1	FBI	Houston, TX	KKI 88
IP1	FBI	Indianapolis, IN	KSC 63
JK1	FBI	Jacksonville, FL	KII 95
JN1	FBI	Jackson, MS	KKJ 45
KC1	FBI	Kansas City, MO	KAG 78
KIH98	FBI	Mobile, AL	
KT9	Unknown		
KV1	Unknown		
KW1	Unknown		
KX1	FBI	Knoxville, TN	KIG 91
LA1	FBI	Los Angeles, CA	KMI 66
LA5	FBI	Los Angeles, CA	KMI 66
LR1	FBI	Little Rock, AR	KKJ 78
LR2	FBI	Little Rock, AR	KKJ 78
LRC33	Unknown		
LS1	FBI	Louisville, KY	KIH 67
LV1	FBI	Las Vegas, NV	KOG 55
LV2	FBI	Las Vegas, NV	KOG 55
MD4	Unknown		
ME1	FBI	Memphis, TN	KIH 73
MIACMU	Unknown		Miami, FL
MM1	FBI	Miami, FL	KIJ 22
MO1	FBI	Mobile, AL	KIH 98
MP1	FBI	Minneapolis, MN	KAG 81
MW1	FBI	Milwaukee, WI	KSC 71
NF1	FBI	Norfolk, VA	KII 66
NH1	FBI	New Haven, CT	KCC 76
NK1	FBI	Newark, NJ	KEC 86
NO1	FBI	New Orleans, LA	KKJ 88
NY1	FBI	New York, NY	KEC 96
OC1	FBI	Oklahoma City, OK	KKJ 98
OM1	FBI	Omaha, NE	KAG 98

PD1	FBI	Portland, OR	KOG 83
PG1	FBI	Pittsburgh, PA	KGG 76
PH1	FBI	Philadelphia, PA	KGG 64
PJ1	Unknown		
PO1	FBI	Portland, OR	KOG 83
PX1	FBI	Phoenix, AZ	KOG 71
QJ1	Unknown		
QT1	FBI	Quantico, VA	KGE 22
QT2	FBI	Quantico, VA	KGE 22
QT4	FBI	Quantico, VA	KGE 22
QT9	FBI	Quantico, VA	KGE 22
RH1	FBI	Richmond, VA	KII 74
RJ1	Unknown		
RJ2	Unknown		
SA1	FBI	San Antonio, TX	KKI 99
SCI	FBI	Sacramento, CA	KSD 73
SD1	FBI	San Diego, CA	KMG 22
SE1	FBI	Seattle, WA	KOH 22
SF1	FBI	San Francisco, CA	KKJ 22
SI1	FBI	Springfield, IL	KSC 81
SJ1	FBI	San Juan, PR	WWR 20
SL1	FBI	St. Louis, MO	KAH 63
SS5	Unknown		
SU1	FBI	Salt Lake City, UT	KOG 93
SUP03	Unknown		
SV1	FBI	Savannah, GA	KII 83
TP1	FBI	Tampa, FL	KIJ 44
WF1	FBI	Washington, DC	KGG 85

The US Customs service had one of the original ALE nets within the US government. Known as COTHEN (Customs Over-the-Horizon Network), this system is used by the US military and civilian law enforcement in their drug interdiction efforts.

Frequencies: 7527 8912 10242 11494 13907 15867 18594 20890 23214 25350

Very few ALE addresses have been seen, much less IDed with this system. Below is what is known at this point.

543P / AR1P / D48P / I57P / MV2P Unknown
TRC Orlando, FL (Tentative)
TST Orlando, FL

FNARS Network

The Federal Emergency Management Agency developed the FEMA National Radio System (FNARS) radio networks. FNARS is an example of an emergency preparedness network that has become significantly important in cases of national emergency.

Frequencies here include: 2658 3341 5402 6809 7348 9462 10194 10588 13446 14776 14885 15708 16201 17519 19969 21866 22983 24526 kHz.

Stations heard so far in the FNARS net include:

908WGY	Denver, CO	WGY 908
AL4/AL4FMA	Montgomery, AL	WGY 954
AR6	Conway, AR	WGY 966
ART	Unknown	
DE3	Delaware City, DE	WGY 953
FC0FEM	Bothell, WA	Region 10/WGY 910
FC1/FC1FEM	Maynard, MA	Region 1/WGY 901
FC5	Battle Creek, MI	Region 5/WGY 905
FC6/FC6FEM	Denton, TX	Region 6/WGY 906
FC8/FC8FEM	Denver, CO	Region 8/WGY 908
FC8FKL	Unknown	
FC9	Santa Rosa, CA	Region 9/WGY 909
FCSFEM	Mt. Weather EAC, VA	Special Facility/ WGY 912
FM0FEM	Bothell, WA	Region 10/WGY 910
FM1/FM1FEM	Maynard, MA	Region 1/WGY 901
FM1FEM1	Unknown	
FM4/FM4FEM	Thomasville, GA	Region 4/WGY 914
FM4FEM1/FM4FMA	Unknown	
FM6/FM6FEM	Denton, TX	Region 6/WGY 906
FM6FEM1/FM6FEM6	Unknown	
FM8FEM	Denver, CO	Region 8/WGY 918
FM8FEM1	Unknown	
FR4/FR4MA	Unknown	
ID0FEM	Boise, ID	WGY 920
IL5FEM001/IL5FMA	Unknown (Illinois)	
KS7FEM/KS7FMA	Unknown (Kansas)	
KY4	Frankfort, KY	WGY 994
KY4FMA	Unknown (Kentucky)	
LA6	Baton Rouge, LA	WGY 946
MEASBAP	Unknown	
MEASWWE	Unknown	
MI5	Lansing, MI	WGY 975
MO7	Jefferson City, MO	WGY 977
MO7FEM	Unknown (Missouri)	
NC4	Raleigh, NC	WGY 984
NC4FEM/NC4FMA	Unknown (North Carolina)	
NE7FEM	Unknown (Nebraska)	
SC4	Columbia, SC	WGY 934
SC4FEM/SC4FMA	Unknown (South Carolina)	
SD8FEM	Unknown (South Dakota)	
UT8FEM	Unknown (Utah)	
VA3	Richmond, VA	WGY 963
VA3FEM	Unknown	
WA0	Olympia, WA	WGY 930
WI5FEM	Unknown	
WV3	Charlestown, WV	WGY 943
WXW	Unknown (National Weather Service?)	

FAA on HF

Another federal agency that makes extensive use of HF as a backup to their normal communication circuits is the Federal Aviation Administration (FAA). This HF system also uses ALE to keep track of things.

Here are the ALE frequencies in the FAA HF network: 5860 6840 6870 7475 7485 7611 8125 9114 9914 11637 13312 13457 13630 15851 16348 24550

Stations identified thus far in the FAA net include:

FAA	Unknown (Tentative FAA headquarters, Washington DC)
FAAACE	Kansas City, MO
FAAACT	Atlantic City, NJ
FAAAEA	Jamaica, NY
FAAANE	Anoka County-Blaine Airport, MN
FAAANM	Renton, WA
FAAASO	College Park, CO
FAAASW	Unknown
FAADCA	Washington, DC
FAAECI	Unknown
FAAEKN	Elkins, WV
FAAKLO	Unknown
FAALGT	Longmont, CO
FAAMRB	Boonsboro, MD (Martinsburg)
FAAOEX	Oklahoma City, OK
FAASJU	San Juan, PR
FAAZAN	Anchorage, AK (Anchorage ARTCC)
FAAZBW	Nashua, NH (Boston ARTCC)
FAAZDC	Leesburg, VA (Washington ARTCC)
FAAZHU	Houston, TX (Houston ARTCC)
FAAZJX	Hilliard, FL (Jacksonville ARTCC)
FAAZLA	Palmdale, CA (Los Angeles ARTCC)
FAAZMA	Miami, FL (Miami ARTCC)
FAAZME	Memphis, TN (Memphis ARTCC)
FAAZMP	Farmington, MN (Minneapolis ARTCC)
FAAZNY	Ronkonkoma, NY (New York ARTCC)
FAAZTL	Hampton, GA (Atlanta ARTCC)

SHARES

The last government system we will discuss is the SHARES (Shared Resources) radio system. Hugh Stegman and I have written extensively on SHARES since its inception. To learn the latest, including ALE information, I refer you to this month's *Fed Files* column for more details and an updated list of frequencies and stations.

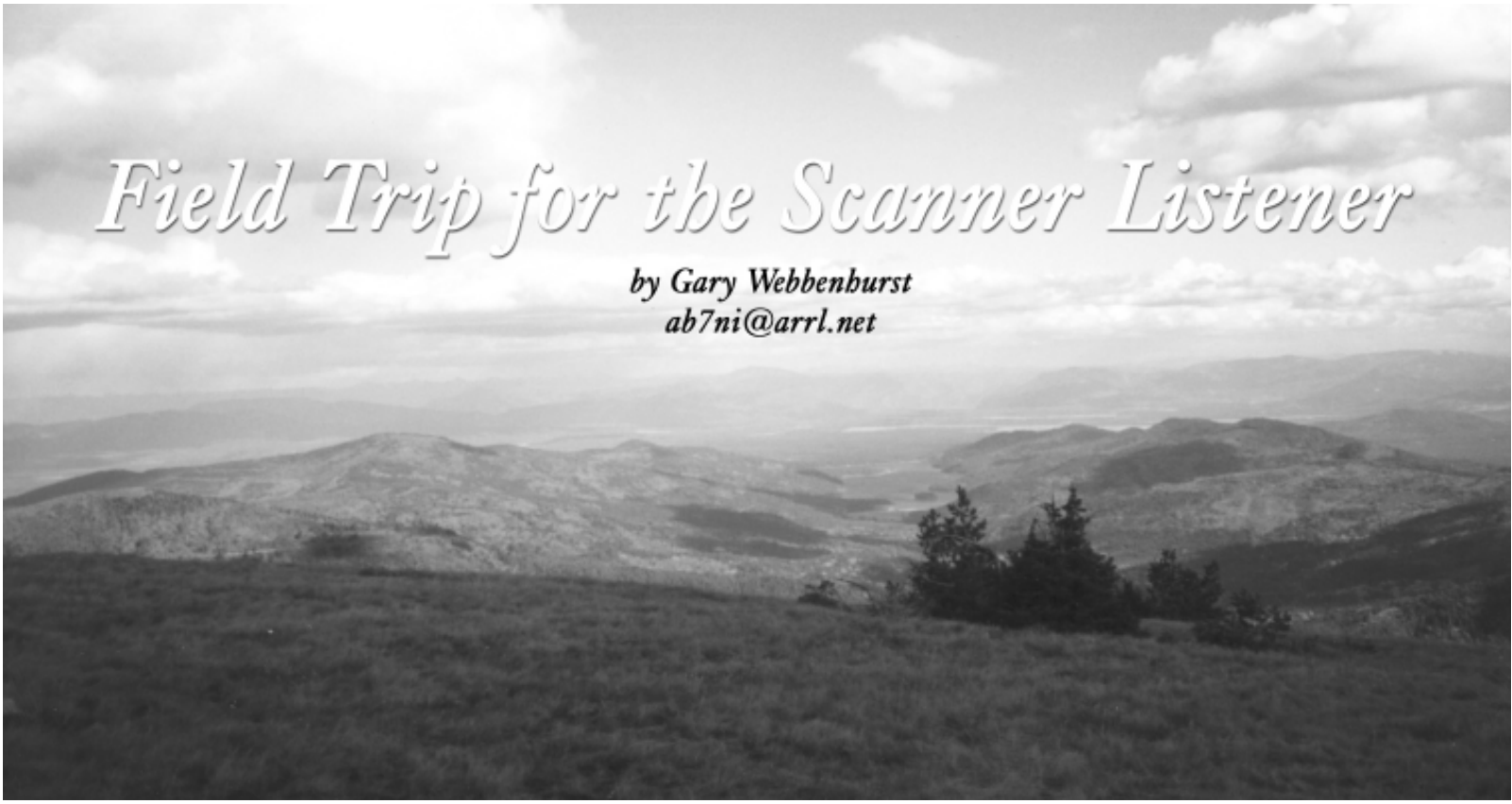
In Closing

This article presents just the tip of the iceberg when it comes to ALE monitoring. Space does not allow us in this article to discuss the many systems used by foreign governments, foreign military, civilian companies, and others. We also could not discuss the nearly 25 systems in our database that are still marked as unknowns. We will attempt to cover all of these radio systems in a future *MT* article on ALE systems.

This article would not have been possible without the tremendous assistance of a dedicated group of ute monitors who contributed their time and expertise to help the author in preparing this work. In particular I would like to thank Dave Batcho, Charles Brain, Jim Dunnett, Jeff Jones, Richard Lacroix, Jack Metcalfe, Roland McCormick, Hugh Stegman, Graham Tanner, David Wilson, and the many more who wish to remain anonymous. Gentlemen, my hat is off to each of you for your help. And we want to hear from you readers. If you have some updates on any of the systems discussed above or information on other ALE system, please contact us here at Monitoring Times, PO Box 98, Brasstown, NC 28902 or email: **larry@grove-ent.com**.

In the meantime keep an eye on the *Fed File*, *Milcom* and *Ute World* columns in this magazine for updates. We will also be posting information on *MT*'s new chat board located on the Grove website at **http://www.grove-ent.com** and on the WUN email newsgroup **(http://www.qth.net)**.

So break out the HF rig, download and install Charlie Brain's PC-ALE program, and join in the communications revolution of the 21st century – monitoring HF ALE.



Field Trip for the Scanner Listener

by Gary Webbenhurst
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Occasionally, I feel the need for some stress relief. For me, that is a daylong reconnaissance trip. I always have the "Grab & Go" fanny pack ready with the necessary radios, accessories and extra batteries. All I have to decide is where to travel? A large city, busy national park, regional airport or US Air Force Base?

There are many possibilities, but my favorite trip is to go to a nearby mountain. More specifically, when I lived in the state of Washington I drove to Mt. Spokane. When I lived in the San Francisco Bay area, it was Mt. Diablo. Many such peaks have a park at the top and are easily accessible. From the top of a 3,500 ft. mountain peak you can hear every agency for about 100 to150 miles. If you are ham, you can work some serious simplex! Remember to take a picnic lunch and a jacket. It is often very windy and cool at the summit.

No matter where you live, there are undoubtedly some similar landmarks near you. Here in South Dakota, I have had to settle for a high hill overlooking two valleys!

Step one – get ready

The key to a successful trip is preparation. Round up all your equipment. My primary equipment includes a PRO 39, 60, 64, Icom W32A, Uniden 895XLT, and a CD-1 tone decoder. Naturally, I have DC power cords and extra batteries.

You say you don't have any of this equipment? Well, consider bringing along a friend with their scanner(s). Or borrow a radio. Or budget for a second scanner. You can find some great deals if you look in the right places. Try Grove Enterprises on the Internet or closeout specials from your local Radio Shack. Leave your name and phone number with the RS manager and tell him to call you if they have any great closeout prices on scanners. Even Wal-Mart closes out scanners for less than $50.

I also bought a new deep cycle marine battery. This energy source means I don't have to worry about robbing my car battery for juice. A dead battery at the end of a day of scanning is a real bummer.

If you have or borrowed a Global Positioning System (GPS) unit, bring it along. Don't forget to get the exact location of the mountaintop. Later, you can do some research by searching the FCC database using the exact location, latitude and longitude. This might help in identifying some of the transmitters on the summit.

I also bring my Optoelectronics® Scout frequency counter. If you do not own a Scout or similar frequency counter, ask around if you can borrow one. You won't want to give it back! I consider my Scout to be the best "radio" I own. I just connect the Scout to a rooftop magmount antenna and drive down the road. The Scout sucks many, many frequencies out of the air. These "catches" are often frequencies that I would not normally find. Please be advised that this process works best if you use a FM broadcast and VHF pager filters. Otherwise, you will be bombarded with many unwanted frequencies.

What about antennas? Minimally, you will need a magmount – or two for better coverage. I also have four roof antennas mounted with NMO connectors. My Dodge Caravan has plenty room, so I bring a Radio Shack tripod RS# 15-517 and a five foot mast RS#15-862. I then attach a discone antenna RS#20-043 and use 20 feet of RG8 coax. Actually a rubber duck will work, but I like to do some real DX! I also round up any extra old scanners or battery packs and make sure they are ready if my primary radios decide to get sick.

Next step is to gather some area maps. If you have AAA membership, you are in luck. The maps are free. If you travel across a state border, the first rest area is often a tourist information site with free state maps. Otherwise, you need to purchase an atlas or individual state/regional maps.

From these maps, I make a list of towns and counties near my destination point. I use a yellow highlight pen to identify all the selected city and county names. I usually limit myself to about a dozen particular counties/cities within a 50-mile radius of the mountain. I also use the maps to verify geographical information like street addresses, and highway numbers that I hear over the airwaves. It is the final confirmation that I have the right frequency matched to the right agency.

Do your homework: check the books, such as ***Police Call***. I also consult ***Monitoring America*** and several of the CD ROM FCC database programs. I can then make a list of potential frequencies, based on my selected cites and counties. I place these frequencies in banks, by geographical area, in my Pro 39. This takes an hour or so, but, hey, this is a hobby and part of the fun is anticipation of what you may hear. Remember what city/county frequencies you have in which radio and in what bank. Bring along your reference books, pens, paper and clipboard(s).

You should preprogram your scanners. Otherwise, you waste valuable time on the summit doing the routine. If your scanners are computer programmable, then it's all the easier. I use the Scancat Gold software that works for both my Pro 64 and the Uniden 895XLT.

I have created many different databases. The one most frequently used has every VHF public safety frequency starting with 150.995 and ending with 159.465. I have room left for UHF, start-

ing with 453.050 and ending with 460.625. My Pro 64 has 400 channels. The download takes about 30 seconds. Awesome! For my Uniden 895XLT, I have a special UHF database that begins with 452.000 and covers up to 458.975. The information source for these frequency blocks is the back of the ***Police Call*** book.

My Pro 60 is a dedicated scanner that has VHF low band, aircraft and military air frequencies. The Icom W32A can simultaneously scan a preprogrammed VHF and UHF search. I can also use the Icom for some simplex or repeater work. You say you don't have all this equipment? Well, that means you just have to work a little harder and use different strategy.

Step two- when to go?

The best time for such a trip is a clear, sunny, fall or spring day. However, I have found that storm days offer a unique opportunity for snowplows, public works and utility crews. Perhaps you can not "see" as far, but you can still hear an incredible range of radio communications. Weekdays are the best, since all government functions are "on duty." Saturday is OK, but Sundays are a bust.

Let's get going! I like to leave early, about 8:30 or 9 o'clock at the latest. When traveling enroute, I try to visit an area Radio Shack store. Check the yellow pages or Internet for store locations. They usually have a one-page list of local frequencies that they hand out for free. (Remember to buy an item or two.) If this is a new geographical region for you, why not buy their regional version of ***Police Call***?

Naturally, I carry the Scout with me and just leave it running. The Scout will log 400 frequencies into memory channels and record the number of hits on each frequency. I mate it up with an MFJ Ruff Rider Hyper Gain™ antenna.

The information is downloaded once I get home. The filters mentioned previously are worth their weight in gold. Even with them, I take a few stray hits from FM broadcasts and VHF paging. I do make hourly checks of the memory channel number to give me some idea of when a certain frequency was captured.

Step three - the actual monitoring

Strategy:

The game I play is simple. My goal is to identify every public service frequency I can hear, then categorize it as to use, callsign, agency, CTCSS (PL) tone, and status as a repeater input, output or simplex. Using the Pro 39, I try to confirm all the published frequencies for the major cites and counties that I predetermined and programmed. After I have confirmed a frequency, I lock it out and concentrate on the remaining frequencies. It is a matter of elimination.

I also have the Pro 64 running the gamut of public safety or other active frequencies. I am pretty much into public safety frequencies, but of course you can search for anything. Aircraft traffic is really impressive at this elevation!

So how do I gather all this information? I have several tactics that I employ. To quickly list the new frequencies, I use my own custom forms (Fig 2). These allow me to make notations quickly. The frequencies are already printed in numerical order. It also keeps the new listings in an understandable and orderly fashion. Of course you can make your own.

Basically, my form lists virtually every VHF LO, VHF HIGH, and UHF public safety frequencies in *numerical order*. As soon as I catch a transmission, I make notes to identify it as an active channel. I can usually determine if it is Law Enforcement, Fire, EMS, Public Works or other. The CD-1 tone reader gives me the PL. That tidbit of information is entered on the same line.

The antenna complex and Ranger fire lookout tower on Mt. Spokane, Wash., are silhouetted against an approaching storm front.

If you only have one scanner, you should preprogram all the agency frequencies you wish to confirm. You must be very focused and use a fast finger to scan, lock out and hold frequencies. You can then use the search function to find new frequencies. To find repeater pairs, check your reference book and ***Police Call*** for the possibilities and then search quickly. Of course on the UHF frequencies, the input is almost always 5 MHz higher. Thus the input for 453.925 would be 458.925.

VHF is where is the real repeater challenge is played out. Just log all the information on your cheat sheet. Then, you can go home and figure out the details based on the raw data.

Operating Procedures

Once you arrive on top of the mountain, there are several things to consider. First is the proximity of radio equipment on the mountain. I get out, walk around, and take a few pictures. If you spot a vehicle near one of the buildings adjacent to the antennas, it is probably a service technician. If you are really nice, he/she will probably let you take a quick look into one of the "vaults" that stores the actual radio equipment. They might even offer some information as to what agencies are on the various radio systems. (Yet another reason to visit on a weekday.)

When I am ready to start monitoring, I move the car as far away from the transmitters as possible. Line of sight is still important, so I park

Microwave dishes and panels abound on Mt Spokane, as well as numerous UHF and VHF antennas. Most are for state and federal systems.

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along the parking lot guard rail or edge of the road. Since there are several powerful radio transmitters on the top, there is bound to be a certain amount of interference. I can lock out birdies I discover as I starting operating. Oh well, it's one of the conditions you must deal with on a mountaintop. But the advantages are many, not the least of which is the breathtaking view. You can see for at least a hundred miles in every direction.

There are three key times to listen. The first is from 11am-1pm. This is often the heaviest radio traffic of the day. Many officers are busy asking other units where to meet for lunch, going code seven and then going 10-8. For detectives, federal agents and the like, this is often the only time you will hear them on the radio. The second window of opportunity is the afternoon shift change, usually between 2 and 4 pm.

Around 5:30-7pm you can count on vehicle accidents to generate some radio traffic. Around this same time, most fire departments test their pagers. This is particularly true of volunteer fire departments. In my neck of the woods, they are very punctual at 6:00 pm and others at 6:30. I usually have one scanner on the basic fire VHF channels in the 153.770 to 154.445 MHz range. You need quick fingers and a speedy pen because the time window is so narrow.

This is also a good time to catch repeater inputs, links and PL tones. They usually throw in their callsign for good measure. Here is a sample of what you might hear*: "This is the Day County Sheriff's Office with the test of the Day County Fire Pager system. There will be a meeting on Tuesday night at 7pm at the firehouse. KML 702."* Yes, don't be surprised if the sheriff's office does the dispatching for fire department. These days, dispatch centers have been centralized for economy. In the western states, sparsely populated counties usually have just one or two frequencies that cover all police, fire, EMS, public works, and emergency management functions.

You have to be quick to write down the callsigns. If you can get a couple of letters and numbers, you can usually figure it out. Look in ***Police Call***: under the frequency, it lists the states in alphabetical order and within the states they are listed alphabetically by the callsign. If you want, you can tape record all this for further analysis at home.

Here is my basic operating procedure: When I hear an active frequency, I hit Manual to hold the traffic. Then, *very* quickly, I check the other radios to see if I can find the same traffic on another channel. This is how I can determine repeater pairs. I can then punch both frequencies into the 895XLT, which can confirm the pair and their PL tones. At home, I can download the

Figure 1: Trip checklist:

- Round up all your scanners, battery packs, DC power cords, and antennas
- Preprogram all your scanners
- Bring along your reference books and frequencies lists
- Blank paper and extra pens
- Clipboards
- Binoculars (optional)
- Beverages and lunch/snacks
- Jacket or rain gear
- Tool box with coax connectors and the usual hobby related tools

Figure 2: Sample Worksheet

VHF Radio Frequencies in Numerical Order with PL and Agency

City_____ **Date**_____ **Completed by** _____

Output	Input	PL	Agency	Type	Output	Input	PL	Agency	Type
150.995					153.920				
151.010					153.935				
151.025					153.950				
151.040					153.965				
151.055					153.980				
151.070					153.995				
151.085					154.010				
151.100					154.025				
151.115					154.040				
151.130					154.055				
151.145					154.070				
151.160					154.085				
151.175					154.100				
151.190					154.115				
151.205					154.130				
151.220					154.145				
151.235					154.160				
151.250					154.175				
151.265					154.190				
151.280					154.205				
151.295					154.220				
151.310					154.235				
151.325					154.250				
151.340					154.265				
151.355					154.280				
151.370					154.295				
151.385					154.310				
151.400					154.325				
151.415					154.340				
151.430					154.355				
151.445					154.370				
151.460					154.385				
151.475					154.400				
153.740					154.415				
153.755					154.430				
153.770					154.445				
153.785					154.650				
153.800					154.665				
153.815					154.680				
153.830					154.695				
153.845					154.710				
153.860					154.725				
153.875					154.740				
153.890					154.755				
153.905					154.770				

information from the Bearcat. I print out a list and then go back and flag the PL tone. I wish the software would also log the tones. It's an extra step, but this is a fun (and challenging) hobby!

If you are stalking a large 800 MHz trunked system, the process of categorizing the many ID talkgroups can take all day. The larger systems can have 300-600 different talk groups. These are usually planned in a logical manner: The fire channels might be in the 3000 range, the sheriff in the 4000 range, utilities in the 5000, etc. I have a small, five-element Yagi antenna to select just the region I want to monitor. Otherwise, in this frequency range you will bombarded by cellular and other 800 MHz interference.

To make myself comfortable, I often sit in the passenger seat or even recline in the rear seat. Every couple of hours it is good to stretch your legs. Around 1pm, I usually "hit the wall." I am suddenly very tired of listening. I often take a short nap. After a break for lunch, I am ready for some "Service Searching" for an hour. I use the Service Banks feature to search the whole range for Police, Fire, etc.

Enjoyable as these trips are, they're even better if I take along a scanner friend. You can gather information much faster and with better accuracy.

Step four – share the wealth

I spend my time on the mountain gathering the data. When I return home I can put the puzzle pieces together at my convenience. It usually takes me several hours spread over several days to sort and organize the frequencies. Don't wait too long to do this. The memory starts forgetting little details after a few days. If you end up with a few puzzle parts that don't fit, that is OK. Remember that some agencies use frequencies that they are not licensed for, or least you cannot find the documentation.

Post your findings. Share the information with fellow scanner enthusiasts. Put it on your webpage, send it to me or to the Scanner Logs column in *MT* to be shared with readers, or submit it to an established site, such as **www.grove-ent.com/hmpgmt.html**. Look for "The MT Frequency Exchange."

Make up a final list in whatever format you wish. Personally, I like two different lists. The first one is ordered numerically, listing all active frequencies, followed by PL tone (if any), input frequency (if any) and then the Agency Name – e.g.. Walnut Creek Fire District. You can do it in a database program or using a word processor in either numeric or alphabetic sort. My second list is by county, their cities, or other agencies. You may find a neat little shareware program called Frequency Filer 4.2 to be helpful. You can download it from: **http://members.aol.com/jgraff/homepage.htm**

I figure that such a trip costs $25-30. That covers a map or two, gas, snacks and fast food dinner. After a hard day of listening, you deserve a good burger! You will be amazed at how tired you are and the incredible amount of information you have collected. It will leave you thirsty for more. Just climb that mountain – again.

About the author:

Gary Webbenhurst, AB7NI, writes the new "Bright Ideas" column in MT. He welcomes email on your results from anyone using this scanner DXpedition technique at ab7ni@arrl.net

SOMALIA ON SHORTWAVE

By Hans Johnson

So you think you have heard it all on your shortwave radio? Guess again. What about Somalia?

With seven stations broadcasting and more on the way, shortwave is booming here; even though Somalia no longer counts as two radio "countries" here (British and Italian Somaliland), it's rare enough to be a good catch for country chasers.

Hearing these stations is "extreme DXing" at its best. Those looking for a challenge for their ears and a supreme workout for their antennas and receivers will find it in this Horn of Africa nation. QSL hunters will have to work all their magic to verify the Somalis.

Some background

Why is Somalia such a hotbed for shortwave broadcasting? The answer lies in its recent history. When the government of strongman Siad Barre collapsed in 1991, Somalia plunged into chaos. Teen-aged soldiers known as "technicals" fought it out in the streets of Mogadishu and elsewhere in the country.

Political turmoil coupled with bad weather led to mass starvation a year later. Images of bloated bellies tugged at Americans' hearts through their television screens. Responding to the media-driven outcry, the United States launched "Operation Restore Hope."

Started as a disaster relief effort, the American effort soon expanded in nation-building and became embroiled in the Somali political scene. But, after images of a naked American serviceman's body were shown on those same television screens, the United States quickly pulled out, concluding that Somalia was too dangerous and its people ungrateful.

Relief efforts continue today, but are much more low-key. Somalia remains a dangerous country for these agencies as they struggle with personnel being kidnapped and perhaps even being murdered. Relief work continues in areas where it is safe enough to do so, but agencies are routinely forced out of areas that are too dangerous or where their efforts are significantly hampered.

The Somali political situation remains in flux. According to Amnesty International (AI), there is no rule of law in Somalia and justice is uneven. Efforts by a number of organizations to mediate a peace process are unsuccessful. There is no central transitional government, and even after a decade of chaos, the militias apparently aren't tired of fighting.

Somali society remains fractured along clan and sub-clan lines with constantly shifting alliances and jockeying for power over anything as small as a city block to a region. Even starting to pick up the garbage and trash that practically buries Mogadishu is to invite militias demanding payment, according to a BBC reporter. Finally, the following Somali saying sums up Somali politics quite well: *"My clan against your clan, my subclan against your subclan, my family against your family, my brother and me against you, me against my brother."*

Long Distance Monitoring

So, how does one tune in to this situation of intrigue from the safety of one's home? Most Somali stations transmit in upper side band (USB) + carrier mode. That means you can hear the station in amplitude modulation (AM) mode, but it will sound stronger on USB. Station powers are modest, ranging from 5 to 2,500 watts. Transmitters are often ex-Post Telephone and Telegraph (PTT) or ex-military units. Stations favor the range between 6700 to 7600 kilohertz (kHz), although they have operated elsewhere on the shortwave dial.

Somali stations do change frequency quite a bit, apparently to avoid interference from utility stations and because of technical difficulties. Most are active three times a day at times corresponding to local morning, afternoon, and evening. Overseas listeners will most likely hear the evening broadcasts, although North American listeners can also have quite a bit of success with the morning transmissions. Programming is mostly in Somali although there is some English. The best part of the programming is the music. The local music is a fascinating combination of African and Middle Eastern styles and is never forgotten once it is heard.

Even after a decade of chaos, the militia in Somalia apparently aren't tired of fighting.

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The stations serve as mouth-pieces for various political groups, which in Somalia often means clans and sub-clans. Others, such as Radio Gaalkacyo, Radio Hargeisa, and Radio Baidoa also serve as voices for regions wishing to break away from Somalia or at least from Mogadishu warlords. Shortwave is the medium of choice because it allows each of these groups to communicate cheaply and reliably nationwide. Commercial media is making inroads in Somalia, but it comes in the form of FM and TV in Mogadishu, not on shortwave.

Stations of Shortwave

Now, let's take a look at the stations themselves. Mogadishu is the place to start as that is where the most stations are located. **Radio Mogadishu, Voice of the People** (Masses) is the station of Somali strongman Husayn Aydid. Using an ex-PTT transmitter, this station has been on and off this year. Somali sources believe that the station receives backing and technical support from other African nations such as Egypt, Libya, and Sudan, while the Somali press reports that an Italian technician has been working on the station. 6760 kilohertz (kHz) is a good bet for this one between 1600-1900 Universal Time (UTC) and especially at 1800, when they have English. 11204 kHz at 0400 UTC is another frequency to plug into your receiver's memory.

Local Somali music is a fascinating combination of African and Middle Eastern styles. (UNESCO photo)

Another warlord, Uthman Ali Ato, is the voice behind **Radio Mogadishu, Voice of the Somali Pacification**. Try 6823 kHz from 1500-1900 UTC, and be aware that they have had English broadcasts in the past. Rival warlord Husayn Aydid has vowed to "reunite" this station with this Radio Mogadishu, but this threat hasn't been carried out just yet.

Radio Banaadir, which refers to the greater Mogadishu region in Somalia, is the newest station in Mogadishu and probably the most mysterious for the moment. It has been widely heard on 7214 kHz between 1600-1900 UTC. A press item, apparently based entirely on a media release from the station, describes the station as commercial and promoting peace and reconciliation. Somali media watchers scoff at this characterization and believe that warlord Husayn Haji Bod is behind the station.

The other mystery concerns the origin of this station's transmitter. In late 1999, a transmitter was tested briefly in Germany and it was made known that the final destination for this unit was Somalia. This seems to be Radio Banaadir's transmitter, which arrived in Somalia via Canada and was installed by a couple of Somalis living in Canada. It is known that both the power of the transmitter tested in Germany and the full power of Radio Banaadir are 2,500 watts, quite a coincidence in a land where this is considered to be a high-powered transmitter.

Somali refugees amid their possessions in Ethiopia (UNHCR photo)

Rounding out the scene in Mogadishu is the status of two stations that are now off of the air. **Radio Mogadishu, Voice of the Somali Republic**, previously operated around 6522 from 1600-1800. This was the mouthpiece of Ali Mahdi Muhammad, another Mogadishu warlord. Muhammad is now allied himself with Husayn Aydid, so they both now apparently share the latter's Radio Mogadishu.

HornAfrik, operating from a freshly painted compound on the outskirts of Mogadishu, has the only FM commercial service in the country. They also have one of the two television services in Mogadishu. But they have no immediate plans for shortwave, says Ahmed Adan, one of their directors. Instead HornAfrik is looking to open other FM outlets in Somalia.

Holy Quran Radio was the station of the Islamic Alhu-Sunna walJamaa (Sunni Masses in Somali) group. Western observers describe this group as Islamic fundamentalists while Somali observers describe it as the oldest, and hence more traditional of the religious groups in Somalia. It used to be heard on 6900 kHz between 1600 and 1900 UTC, but is now off the air.

It is worth noting that a new station has popped up on Holy Quran Radio's old frequency of 6900 kHz between 1600 and 1730 UTC. This station is from Kismaayo in the south of Somalia and is simply known as **Radio Kismaayo**. Could it be that Radio Kismaayo purchased or obtained Holy Koran Radio's equipment? Somali media watchers interviewed for this article say that the station is run by the Marehan tribal clan living in this area, which may mean that it is connected with the Somali National Front group. Its exact affiliation isn't known as the Front has recently split into two rival factions.

In early 2000, a station tested from Baidoa around 9400 kHz from 0900-1100 UTC. This is the station of the Rahaweyn Resistance Army, a group seeking to rid this part of Somalia from the grasp of Husayn Aydid. It is known, unsurprisingly, as **Radio Baidoa**. The station hasn't been noted since those brief transmissions early in 2000. RRA sources interviewed for this article describe these broadcasts as "tests" and said that they would start regular transmissions quite soon. Other Somali sources say that the station has technical difficulties and will need repairs before it returns to the air. In any event, it is worth tuning in 9400 kHz.

Radio Hargeisa is the voice of the self-declared nation of Republic of Somaliland. Although not internationally recognized, Somaliland does handle its own affairs, including broadcasting. Radio Hargeisa operates a 1,000 watt transmitter on 7530 kHz. This has been the easiest Somali station to hear recently, especially during its 1500-1800 UTC broadcasts. Perhaps this is related to the fact that the station received assistance from Yemen in September 1999. There is also a lesser-heard broadcast from 0500-0600. The audibility of this station should be improving further in the future as Sam Voron [see side bar] will be visiting the station.

Radio Gaalkayco (Gal-kai-yo) is the station of the self-declared State of Puntland. Puntland does not want to break away from Somalia as Somaliland does, but it does want to be a "state" within a federal Somalia. Radio Gaalkayco began in 1993 as Radio Free Somalia, thanks to Sam Voron and his Australian-based International Amateur Radio Network (IARN) [see sidebar]. The main station for Radio Gaalkayco is located in its namesake city in central Somalia, where it operates with just 125 watts on 7012 kHz. The best time to hear this one is from 1600-1700 UTC, but there are also broadcasts from 1000-1200.

NGOs are your best bet for getting a reception report into the country (UNESCO photo)

Hassan Mohammed Jama, Director of Radio Gaalkacyo, explains that they are in rather difficult times right now. "We used to transmit with 800 watts, but our main amplifier is now longer working, so we are limited to 125 watts," says Jama. He added, "With just the small amplifier, we cannot cover our audience in Puntland, let alone all of Somalia." Jama also reports that Radio Gaalkayco once had a log periodic antenna that they used for international broadcasting, but this unit is beyond repair.

In spite of these problems, Radio Gaalkayco also operates the only network in Somalia. There is a 5 watt relay of the station using a Yaesu FT 747 in the town of Bossasso on 6012. A second relay at Puntland's "capital" of Garoowe is planned, but Puntland does not have the funds to put such a relay on the air at present.

Radio Gaalkayco does have a working fax machine so DXers can fax their reception reports to the station. Try 252 543 4501 [One of the paradoxes of Somalia is that the civil war destroyed the old phone system, so the telephone system is very modern, with various private companies competing to offer telephone services.

Verification of any of these stations will be tough. With its fax, Radio Gaalkayco is easy to contact. Regular mail to the country just cannot be counted on, so DXers will need someone to take their letter into the country. NGOs (non-governmental organizations) are probably their best bet.

With two radio countries and a growing number of stations, Somalia can keep you busy listening and writing for quite some time. Enjoy!

Somalia's Best Radio Friend is from Down Under

Sam Voron of Australia is Somalia's best radio friend. Through his Australian-based International Amateur Radio Network (IARN), Sam was instrumental in establishing Radio Free Somalia, now Radio Gaalkayco, in 1993. This was a non-profit volunteer effort and involved a lot more than in just sending equipment to Somalia. Sam spent months in country setting up the station and teaching the staff how to run it.

Now Sam is headed back to Somalia. Part of his trip will be restoring Radio Gaalkacyo to its 1993 level, or at least close to it. "I need to get there and see what has happened to their big amplifier," he says. Sam will also be traveling to Hargeisa. He will be doing a lot of radio work in Somaliland and this may include some work at Radio Hargeisa. So thank Sam if you hear either of these stations in the future. If you like to help Sam in his work, you can contact him as follows: IARN, 2 Griffith Ave, Roseville NSW 2069, Australia. Or you can phone/fax him at 61 (2) 9417-1066.

GLOSSARY

A Glossary of radio related terms used in *Monitoring Times*. (See www.grove-ent.com/mtglossary.html for a much more comprehensive list.)

THE RADIO SPECTRUM

ULF - Ultra Low Frequency (3-30 Hz)
ELF - Extremely Low Frequency (30-300 Hz)
VF - Voice Frequencies (300 Hz-3 kHz)
VLF - Very Low Frequency (3-30 kHz)
LF - Low Frequency (30-300 kHz)
MF - Medium Frequency (300 kHz-3 MHz)
HF - High Frequency (3-30 MHz)
VHF - Very High Frequency (30-300 MHz)
UHF - Ultra High Frequency (300 MHz-3 GHz)
SHF - Super High Frequency (3-30 GHz)
EHF - Extremely High Frequency (30 GHz and above)

// - Indicates a Parallel Frequency
µF - Microfarad
µH - MicroHenry
AC/ac - Alternating Current
AGC - Automatic Gain Control
AM - Amplitude Modulation
ARRL - American Radio Relay League
BCB - Broadcast Band (530-1705 kHz AM)
Bd - Baud
BFO - Beat Frequency Oscillator
BNC - Coax connector commonly used with VHF/UHF equipment
CB - Citizen Band
C-band - 3.7-4.2 GHz
Comm - Communications
CQ - General call to all stations
CTCSS - Continuous Tone Controlled Squelch System
CW - Continuous Wave (Morse code)
DAB - Digital Audio Broadcast
dB - Decibel; dBi- decibels over isotropic
DBS - Direct Broadcast Satellite
DC/dc - Direct Current
de - Morse code prosign meaning "from"
DSP - Digital Signal Processing
DTMF - Dual Tone Multi Frequency
DTRS - Digital Trunk Radio System
DX - Distant Station Reception
DXer - A person who engages in the hobby of distant radio/television reception
DXing - The hobby of listening to distant radio or television signals
DXpeditions - DX Expeditions (trips to the boonies by radio listeners)
ECPA - Electronic Communications Privacy Act
ECSS - Exalted Carrier Selectable Sideband
E-skip - Sporadic E-layer ionospheric propagation
FCC - Federal Communications Commission
FD - Fire Department
FM - Frequency Modulation
Freq - Frequency
FRS - Family Radio Service
GHFS - Global High Frequency System
GHz - Gigahertz
GMDSS - Global Maritime Distress and Safety System
GMRS - General Mobile Radio Service
GMT - Greenwich Mean Time (replaced in most applications by UTC)
GPS - Global Positioning Satellites
GSM - Global System for Mobiles (900 MHz)
HT - Handi Talkie/Handheld Transceiver
Hz - Hertz
ID - Identification
IF - Intermediate Frequency
IRC - International Reply Coupon
ISB - Independent Sideband
kHz - Kilohertz
km - Kilometer
Ku-band - 11.7-12.2 GHz (plus 12.2-12.7 GHz in North America)
kW - Kilowatt
LCD - Liquid Crystal Display
LED - Light Emitting Diode
LNA - Low Noise Amplifier
LNB - Low Noise Block Downconverter
LNBF - Low Noise Block Downconverter Feedhorns
LSB - Lower Sideband
LT - Local time
LW - Longwave (150-300 kHz)
mb/MB - meter band/Megabyte
MDT - Mobile Data Terminal
MF - Medium Frequency
MHz - Megahertz
ms - milliseconds
MT - Monitoring Times
MUF - Maximum Usable Frequency
mW - Milliwatt
MW - Medium Wave (typically 530-1710 kHz)
MW - Megawatts
NCS - National Communications System/Net Control Station
NDB - Non-Directional Beacon
NFM - Narrowband Frequency Modulation
NiCd - Nickel Cadmium Battery
NiMH - Nickel Metal Hydride battery
No Joy - Station did not answer call
NWR-SAME - National Weather Radio Specific Area Message Encoding
Ops - Operations
Packet - Amateur radio error correcting mode
PC - Personal Computer/Printed Circuit
PCS - Personal Communication System/Satellite
PD - Police Department/Primary Data
PFC - Prepared Form Card
PL - Private Line
Q - Performance rating regarding selectivity or bandwidth
QRM - Interference from another station
QRN - Interference from natural or man-made sources
QRP - Low power operation
QSL - A card or letter confirming reception of a radio station
QSO - Communications between two or more stations
QTH - Location
RDF - Radio Direction Finding
RF - Radio Frequency
Rptr - Repeater
RTTY - Radioteletype
SASE - Self Addressed Stamped Envelope
S-band - Microwave frequencies above UHF
SCA - Subsidiary Carrier Authorization (now known as SCS)
SCPC - Single Channel Per Carrier
SCS - Subsidiary Carrier Service
SELCAL - Selective Calling
Sesqui - A "Hauserism" meaning one and one-half
SINAD - Signal to noise and distortion ratio
SINPO - A code system used by radio hobbyists to indicate how well a station was received: S=Strength, I=Interference, N=Noise, P=Propagation, O=Overall (sometimes shortened to SIO)
SITOR-A(B) - Simplex teleprinting over radio system, mode A (B)
S-Meter - Signal Strength Meter
SMR - Specialized Mobile Radio
S/N Ratio - Signal-to-Noise Ratio
SSB - Single Sideband
SSN - Sunspot Number
SW - Shortwave (high frequency - HF)
SWBC - Shortwave Broadcast
SWL - Shortwave Listener
SWR - Standing Wave Ratio
Tac - Tactical
Tent - Tentative
TIS - Traveler Information Service
TVRO - TV Receive Only
Tx - Transmit
UHF - Ultra High Frequency
UKoGBaNI - United Kingdom of Great Britain and Northern Ireland
ULS - Universal License System
Unid - Unidentified
USB - Upper Sideband
UT - Universal Time
UTC - Universal Time Coordinated
Vac/VAC - Volts Alternating Current
Vdc/VDC - Volts Direct Current
VFO - Variable Frequency Oscillator
VOLMET - Aviation Weather Broadcasts (on HF)
VOX - Voice Operated Relay
VSWR - Voltage Standing Wave Ratio
WAM - Wideband Amplitude Modulation
WEFAX - Weather Facsimile
WFM - Wideband Frequency Modulation
wpm - Words Per Minute
WWV - National Bureau of Standards Time Station, Ft. Collins, CO
WWVH - National Bureau of Standards Time Station in Hawaii
Wx - Weather
WXSAT - Weather Satellite
X-band - Expanded AM broadcast band (1610-1700 kHz)
Zulu - Military time zone (same as UTC)

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Join the Club

As a beginning radio monitor, you may have noticed that there are quite a number of radio hobby clubs that one can participate in. Clubs exist for affiliation and information exchange. They can often get targeted information to their membership in a way that a more comprehensive, monthly magazine cannot due to time and space considerations. For this reason, belonging to a club or two that relates to your areas of radio monitoring interest is something well worth considering.

Another important thing that clubs do is to provide for affiliation and social contact in a hobby that would otherwise be pretty much a solo endeavor. Some aspects of our hobby can best be enjoyed when communicated to other "like minded" folks. Many clubs hold gatherings or conventions that allow you to get together with other hobbyists to share your radio monitoring interests. Some of my oldest and dearest friends are people I first met through membership in one radio club or another.

There are many clubs out there in radio hobby land and choosing the one most suited to your interests can be somewhat confusing for beginners. So we'll start out with one of the best clearing houses for radio club information.

The **Association of North American Radio Clubs** (ANARC) was founded in 1964 with the goal of promoting close ties and interchange of ideas and information among North American radio clubs. I have had the privilege of serving on its Executive Board for a number of years. During my tenure, the President of the Board has been Mark Meece. Mark is a DC to Daylight (all bands, all frequencies) monitor and a dedicated amateur radio operator. He is also a respected author in the radio hobby. Under Mark's direction, ANARC has taken many steps to promote the radio monitoring hobby, including the establishment of a strong World Wide Web presence for its affiliated clubs at **www.anarc.org** .

Membership as an affiliated club in ANARC is open to all clubs of radio monitors whose headquarters and principle places of business are located in North America or the Caribbean and publish a club bulletin no less than four times per year. So this seemed like as good a place as any to begin a search for clubs that would be of interest to radio monitoring enthusiasts.

ANARC presently has 14 member clubs. Lets take a look at what they all have to offer the beginning radio hobbyist.

All Ohio Scanner Club

The All Ohio Scanner Club is one of the larger clubs devoted to primarily to VHF/UHF scanning, but their club journal also contains articles on shortwave and utility monitoring. Don't let the club's name fool you. While its roots are clearly in the Ohio area, their journal provides frequency information and news for

John McColman, left, being presented with the ANARC AWARD by ANARC Chairman Mark Meece at the 1999 Kulpsville Winter SWL Fest. Photo by Ed Muro

many of the other areas east of the Mississippi. They also hold an annual picnic each year for members to meet face to face. The club journal *American Scannergram* is published 6 times per year. Dues are $18.50 for US members, $22.00 for Canadian and $30.00 elsewhere. A sample copy is available for $3.50. You can write the club at All Ohio Scanner Club, 20 Philip Drive, New Carlisle, Ohio 45344-9108 USA. The club website is at **www.aosc.org**

American Shortwave Listeners Club

The American Shortwave Listeners Club is a non-profit hobby radio listeners club. Their motto is "*world friendship through shortwave radio*. The club's activities are directed towards advancement of the shortwave/worldband radio listening hobby and the development of the individual's interest in worldband radio listening. The club holds monthly meetings which are held on the first Saturday of each month at 12 noon (2000 to 2400 hours UTC) at 16182 Ballad Lane in Huntington Beach, CA 92649. You can also get more information by writing to the same address. You can also write the club via email: *wdx6aa@earthlink.net*. Their website is located at **www.ocnow.com/community/groups/shortwaveradio/**

Association of Clandestine Enthusiasts

The Association of Clandestine Enthusiasts (ACE) is the most active Clandestine/Pirate radio club in North America. They publish a monthly newsletter *The ACE*. Sample copies are $2.00 in North America and 3 IRCs elsewhere. Club dues are: $21.00 USA and possessions; $26.00 Canada/Mexico, $40.00 elsewhere. You can write the club at P.O. Box 12112, Norfolk, VA 23541 or check out their website at **www.frn.net/ace/**

Canadian International DX Club

The Canadian International DX Club is a "one stop" club geared to Canadian monitors but welcomes worldwide members. The club's interests include medium wave, shortwave, utility, amateur and FM listening as well as technical topics. Their newsletter *The Messenger* is published monthly. Sample copies are $2.00 in North America or 4 IRCs elsewhere. Dues are $27 $27 USA; $32 Canadian Dollars in Canada; $33 US or $42 Canadian Dollars elsewhere. For more information you can write CIDX at 79 Kipps St., Greenfield Park, Canada J4V 3B1 or vist their website at **www.anarc.org/cidx/**

Cumbre DX

Cumbre DX is a bit different in that it is a shortwave interest, E-mail-only club that relies on participation from its members for content. So for this reason the best way to learn the details of this group is to visit their website at **www.cumbredx.org/** The club's electronic newsletter is distributed weekly on Fridays. Dues: Membership is open to anyone who contributes loggings to the newsletter. The club also has a weekly shortwave radio program "Dxing With Cumbre" broadcast on WHRI and KWHR.

DecalcoMania

DecalcoMania caters to people who collect and trade radio and TV station promotional items and recordings. Membership is open to all persons interested in collecting these items. The club holds an annual get-together. Their newsletter is published 10 times per year. Sample copies are $1.00. Dues are $10.00 US; $11.00 Canada/Mexico; $16.00 Europe; $17.50 Asia You can write the club at 9705 Mary NW, Seattle, WA 98117. Their website is at **www.anarc.org/decal/**

International Radio Club of America

The International Radio Club of America is devoted to medium wave listening. Their newsletter *DX Monitor* is published 34 times per year. Sample copies are one First Class stamp in North America, 40 cent stamp in Canada and 2 IRCs elsewhere. Dues are $25.00 US, $27.00 Canadian; $35.00 Central America/Caribbean/Columbia/Venezuela; $38.00 Europe/North Africa/Middle East $38.00; $41.00 elsewhere. Write them at P.O. Box 1831, Perris, CA 92572-1831 or web them at **www.geocities.com/Heartland/5792/index1.html**

Longwave Club of America

The Longwave Club of America, as the title suggests, specializes in longwave monitoring. Their monthly newsletter is *The Lowdown*. Sample copies are $1.00 North America, elsewhere 5 IRCs. Dues are $18.00 USA; $19.00 Canada; elsewhere $26.00. You can write them at 45 Wildflower Road, Levittown,PA 1905. Their website is at **www.anarc.org/lwca**/

Miami Valley DX Club

The Miami Valley DX Club is an All Wave club. They also hold monthly meetings and publish a monthly newsletter *DX World*. Sample copies are $1.00 US and 3 IRCs elsewhere. Dues are $10.00 US and they ask that you write for other area's rates. You can write to P.O. Box 292132, Columbus, OH 43229. Their website is at **www.anarc.org/mvdxc**/

Minnesota DX Club

The Minnesota DX Club is another All Wave club that also holds regular monthly meetings, usually around the Minneapolis area. So it encourages local membership from the Minnesota and Western Wisconsin area. They publish a newsletter and dues are $10.00. You can write them at 16330 Germane Ct W, Rosemount, MN 55068 USA. Their website is at **www.frontiernet.net/%7Ejadale/MDXC%20home.htm**

North American Shortwave Association

The North American Shortwave Association, also known as NASWA, is one of the largest shortwave listening clubs in North America. They hold monthly meetings in various regions of the United States including the Philadelphia and Boston areas. They are also the sponsor of the Winter SWL Festival which has been held annually for 13 years in Kulpsville, PA – one of the largest gatherings of radio monitoring hobbyists in the world today. Their publication *The Journal* is published monthly; I've had the privilege of being a contributing editor in its pages for over 15 years.

Sample copies of the newsletter are $2.00. Dues are $26.00 in North America; $29.00 in Central America/Caribbean/Venezuela/Columbia; $29.00 in the rest of South America/Europe; $32.00 Asia/Africa/Pacific. You can write them at 45 Wildflower Road, Levittown, PA 19057. Their website is at **www.anarc.org/naswa**/

Incidently, if you noticed that this is the same address as the Longwave Club of America, that is because both magazines are managed and published by Bill Oliver, one of the most dedicated and respected radio monitoring hobbyists in the world.

Pacific Northwest, British Columbia DX Club

The Pacific Northwest, British Columbia DX Club is an All Wave club that encourages fellowship and information exchange among radio monitors in the Washington, Oregon, Idaho and British Columbia area. They hold regular meetings and get-togethers. Their newsletter *PNBCDXC* is published 10-12 times per year (depending on contributions.) Dues are $9.00 US; $10.00 in Canada. You can write this group at 9705 Mary NW, Seattle, WA 98117. Their website is at **www.anarc.org/pnbcdxc/**

Southern California Area Dxers

The Southern California Area DXers is an All Wave club for folks in the Southern California region. They hold monthly meetings and an annual picnic. The club dues are $10.00. You can learn more by writing to SCADS at 6398 Pheasant Dr., Buena Park, CA 90620 USA. Web them at **http://scads.dgx.net/**

Worldwide TV-FM DX Association

The Worldwide TV-FM DX Association, as its name suggests, covers TV and FM radio monitoring. They also are one of the major clubs covering satellite monitoring. They publish some excellent technical articles as well as many other things in their monthly newsletter the *VHF-UHF Digest*. A sample costs $1.00 in North America and 6 IRCs elsewhere. Annual dues are $24.00 US, $26.00 Canada, $38.00 elsewhere. The club requests US funds only. You can write them at P.O. Box 501, Somersville, CT 06072, USA. Their website is located at **www.anarc.org/wtfda/**

More Options

You can find these and many other North American and international clubs and radio nets listed on the *MT* website at **www.grove-ent.com/mtclubs.html**, or send an SASE to "Club Circuit" c/o *Monitoring Times* for a hard copy of the 6-page list!

If your interest runs toward amateur radio, The American Radio Relay League (ARRL) serves as the parent organization for the majority of ham radio clubs in the United States. "The League," as it is known, is a club in its own right: you can join it, participate in its activities and conventions, and receive its publication *QST* and other publications as well. Regular membership is $34 per year. You can get more information by contacting The American Radio Relay League, 225 Main St., Newington, CT 06111 phone (860) 594-0200 fax (860) 594-030 or e-mail *circulation@arrl.org* .

In addition to offering membership in the larger League organization, the ARRL maintains information on hundreds of League-affiliated local clubs and organizations to help you find hams in your own area. The best direct source for this information is the ARRL website area dedicated to this task, **www.arrl.org/field/club/** .

By the way, the main League page at **www.arrl.org** is a great place for any radio hobbyist to visit. But I'll give you fair warning. If you are not already a ham, after a few minutes at this page you will probably want to be one.

So, as they say, "Join the Club!" Have fun...and don't be too surprised if you see Old Uncle Skip at one of your meetings.

Ask Bob

Bob Grove, W8JHD
bgrove@grove-ent.com

Q. Is there any radiation danger living just a few feet from a TVRO satellite dish? (Donald Michael Choleva, Eastlake, OH)

A. None whatsoever. These dishes are receive only; like a giant concave mirror, they collect whatever waves strike their surface and reflect (focus) them to a point at the feed horn where they are conducted into the electronics of the system. They radiate no energy of their own.

Q. A recent newspaper story described a new device that can reveal what radio station a driver may be listening to as he passes by. Is this device similar to what has been used for decades in the U.K. to detect unlicensed radio receivers in use? Can it tell what frequencies I'm listening to in my scanner? Can I detect the detector if it's in use near me? (Bob Stewart, Ft. Worth, TX)

A. Basically, it's merely a sensitive receiver detecting the local oscillator frequency of the radio; you tune a radio, TV, or scanner by varying the frequency of that oscillator. The range is quite limited, because oscillators, by law, must be well shielded to prevent interference to other nearby devices.

Yes, it's the same basic concept used in the U.K. by which government-outfitted vehicles can drive by a residence and listen of the telltale oscillator signal; if they hear it, they check their records to be sure the addressee has paid his license fee.

Although scanners do, indeed, radiate their oscillator signals, and they could be detected by such a nearby device, the user would have to know the manufacturer and model of the scanner to sort out the various oscillator frequencies used by different models.

And if you knew the oscillator frequency of the detecting device, you could conceivably listen to determine if it's being used near you. But the likelihood of such a device being used in most U.S. cities, saturated with signals from every direction, is slim.

Q. Are you aware of a surveillance tracking device consisting of a transmitter dropped into a vehicle's gas tank, energized like a fuel cell from the gasoline? (Pedro Zuniga, San Antonio, TX)

A. No, and I doubt that such a device exists. In the first place, a low-powered transmitter in a gas tank wouldn't radiate anywhere because it is totally shielded by metal. In the second place, fuel cells work on the chemical oxidation of gasses produced by water and, soon, methyl alcohol, not on petroleum. And finally, there is a filter/anti-siphon barrier in the filler pipe which would prevent such a device from reaching the fuel tank. Sounds like a flight of fancy, not reality.

Q. For radio antennas, is there any difference in performance between a hollow tube and a solid rod? (Matthias A. Wirtz, e-mail)

A. No. At radio frequencies, the signal energy propagates along or near the surface of the conductor, not the center, so a hollow tube works just as well as a solid rod.

Q. How do I renew my amateur radio license? (James Ashe, S. Weymouth, MA)

A. There have been some changes. The new Universal Licensing System (ULS), intended to streamline licensing procedures, requires you to file a form 605 with the Federal Communications Commission (FCC) in Gettysburg, PA.

Details are available on line by visiting the American Radio Relay League (ARRL) Web site, particularly this URL: **www.arrl.org/fcc/uls-qa.html**. You may also write directly to the FCC at 1270 Fairfield Road, Gettysburg, PA 17325-7245 and request the ULS form 605. There is no charge.

For additional information on amateur licensing questions, visit the informative ARRL Web site at **www.arrl.org** or call them at (860) 594-0200. They have informed staffers there who will answer your questions thoroughly.

Q. Back in the '80s I acquired a Regency 1000 scanner and a Kenwood R2000 shortwave receiver. Are these now too antiquated for serious monitoring of the spectrum?

A. Absolutely not. The early Regency scanners, while not being as feature-packed as modern scanners, had excellent sensitivity and selectivity. And the R2000 is still respected among those of us who remember that model.

Are there better scanners and shortwave receivers out there now? Absolutely – but they cost more, too! The two models you have will serve well to bring you up to speed on what's going on in the spectrum now, and when you're ready to move up, take a look at the products offered in the pages of *Monitoring Times*!

Q. Where can I buy crystals for my old model scanner? (A.C. Hall, Wake Forest, NC)

A. Radio Shack can normally order these for you, and you can sometimes find good used crystals by contacting Gerry Oliver at G&G Communications, 7825 Black Street Rd., Le Roy, NY 14482; phone (716) 768-8151.

Bob Parnass also recommends Crystal Manufacturing Company, 11 N. Lee Ave., Oklahoma City, OK 73102, (405)236-3741 or (800)725-1426. (See *Scanner Equipment* column, Oct 1999)

Q. I have a GPS vehicle tracking system with 200 foot accuracy; I would like to improve the resolution. Can it be done? (Mike McCray, e-mail)

A. No. The U.S. military won't allow closer resolution because of the tactical implications to an aggressor or terrorist. Sometimes the accuracy is better, sometimes worse. For their own use, the military has a second frequency on the GPS birds with far tighter accuracy, but the signal is heavily digitally encrypted. (See the May *Digital Digest* column for more on Differential GPS: a more accurate, but primarily maritime service.)

Questions or tips sent to "Ask Bob," c/o MT are printed in this column as space permits. If you desire a prompt, personal reply, mail your questions along with a self-addressed stamped envelope (no telephone calls, please) in care of MT, or e-mail to bgrove@grove-ent.com. (Please include your name and address.) The current "Ask Bob" is now online at our WWW site: www.grove-ent.com

Gary Webbenhurst
ab7ni@arrl.net

Service Search Scanning

When you acquire a new (or used) radio, make a photocopy of the owner's manual. Skip the pages on how to install the BNC antenna, etc. and copy how to program the radio, how the features work, and the explanation of the keyboard functions. Hole punch the copy and store it in a three ring binder. The binder serves as a central source for quick radio reference. This allows you to freely use a highlighter pen as you read the photocopy. Keep the original manual with the box and packaging materials. If you decide to return or resell the radio, you still have the manual and box in pristine condition.

I am big on three ring binders to stay organized and have at least a dozen such binders. I buy the type that has a see-through vinyl cover so I can slide in a cover page. For example, my cover for the binder mentioned above reads: "Manuals and Programming Ideas for the Bearcat 835XLT, Pro 26, 64, 75, and 94. Includes Bank Assignments and Keypad Tricks." I used large, 48-point, bold fonts for the text and added color. I searched the internet and came up with several graphics of Pro Series scanners (try **http://n7olq.home.att.net/Radio/Galleryframe.htm**) to toss in the middle of the page.

My HP color DeskJet makes great looking cover sheets. Use the "Best" print quality under the properties setting and always use Print Preview to make sure it looks right before the final printing. With labels and divider tabs, the end result is a very professional looking binder. The large print means I can find it in a hurry. I also use a small label for the heel of the binder. A little scotch tape will make sure it doesn't fall out.

I always carry a small pocket-sized notepad and pen. How many times have you heard a new frequency or term and forgotten it before you could get it written down? Happens more often with age! I also carry the little sticky type note pads..

Post-it® notes come in a pad of 50 or 100. I break the big pad into several smaller ones to place in the many places I might need one. I always have sticky notes next to the scanner. The smaller pads can also be used as flags or bookmarks in your reference books.

While you are at it, buy a box of good pens. My pens always seem to disappear daily. If you know how to hang on your pens, let me know!

Check for local conventions or trade shows in your city that are based around the fire, police, EMS, or public safety industry. The admission to the trade show floor is usually free. There may be a wide assortment of emergency vehicles, radios and similar displays. Likewise, keep your eye open for an open house or similar event at public safety agencies.

When is a "Service" search not a real search? The Pro 94 and its base/mobile model twin, the Pro 2052, are the most recent Radio Shack trunk tracker radios made by Uniden. Some of the preprogrammed "service" searches are woefully lacking. In the Pro 94, weather, marine and ham coverage are comprehensive. The air group has continuous coverage 108-136.975, but a better range would have been 118.000-136.975. The 108-118 is primarily navigational aids. The 12.5 kHz steps double the scan time.

The big problem is with the police service band. Amazingly, they deleted coverage from 37.98 to 39.48 and 39.94 to 43.64. Those looking for the California highway patrol will be disappointed. They included the VHF fire frequencies, but omitted most of the VHF police. There were many holes in the 453.XXX MHz group and, incredibly, the entire 460.025-460.525 range was omitted. The 800 MHz range was no better, with only partial coverage and ignoring the much-used 886.000-868.9875. The Pro 2052 has similar problems. To really search out these public safety allocations, you will need to program a limit search. Tip: Better check your radio for completeness of coverage.

Or, maybe it's time for a new scanner? While most of the hype lately has been over the newly released trunk tracker radios, many of us live in areas where most of the action is still on plain old VHF and UHF. For less than $100, you can order a new scanner from **www.grove-ent.com**. I also stumbled unto a good buy at Wal-Mart. They had the Uniden Bearcat 350A for $89.

Uniden has other models and made some clones for Radio Shack. They can often be found for just a few bucks at garage sales and swap meets. There is no keypad; rather there are several search options. Here is the tip that makes this radio a great value. You can lock out as many frequencies as you wish, unlike most radios where you can only lock out 20 or 30 channels.

Example: The Police Service button will start flying through several hundred preprogrammed frequencies. The majority of these are in the UHF-T band of 470-512 MHz. It took me about 10 minutes, but I locked out all these frequencies since they did not apply to my location. They are typically used in just a handful of major metropolitan cites. If I did live in one of these locations, I could do the opposite and lock out everything except the UHF-T.

More tips on the Uniden 350A and similar radios. After I locked out birdies or unneeded freqs, I decided what to load into the 20 programmable slots at the end of the police preprogrammed range. Think big! You can program *anything* into these 20 slots. They could be Coast Guard (from the Marine service) or emergency ham repeaters, fire or emergency management frequencies. If I have some really important police frequencies, I can add them in to get double coverage.

The same strategies can be applied to the Fire Service band, except they only have 10 open slots. In my area, several Fire Departments use public safety frequencies that are "Local Government." An example is my county fire department with an output of 154.085. So how do you program this into the Fire Service bank? Press the Police Service Button and then the Hold button. Use the up or down arrow keys to select 154.085. (If you hold the arrow keys down, the numbers will scroll by very fast. You need quick fingers). When you have selected 154.085, press the Program button and then the Fire/Emg button. Using the up and down arrow keys, select an empty channel. Then press the Prog button and the frequency is now written into the memory channel you selected.

There is also a "Private Bank" with 20 programmable slots. You can use this one as your main scanning band. Remember, you can program anything into these slots from the WX, Marine, Air or any Search Range. Best of all, these service searches truly cover most of the appropriate frequencies.

Final, important hint for the 350A class of scanners: The internal memory is supported by a small rechargeable battery. If you leave the radio unplugged from a power source for more than a couple of days, *it will lose all its memory*. Your careful pruning and adding of frequencies will be lost. I learned that one the hard way.

Are you using your highlight marker? Making notes on the front cover of *MT* regarding articles of special interest? Taking advantage of sources for free books, maps etc.? Very good! I look forward to sharing more tips next month.

Richard Barnett
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Exciting New Advances in Scanners

While the scanner hobby continues to be bedeviled by the dire warnings of the advance of digital, the complexities of trunking, and the migration of hobbyists from radio to the Internet, there are bright spots on the horizon. Manufacturers continue to offer new and exciting product to support their customers. Likewise, our support of these manufacturers is critical to the long-term condition of our hobby. Let's offer some Kudos to some of the following new products that are soon to be released.

❖ Uniden-Bearcat BC-780XLT

We'll cover this most exciting advanced receiver in a later issue. As of this writing, however, the publicly released information about the new base/mobile is pure nirvana: 500 channels, Motorola (control channel), Ericsson and LTR trunking, 2-line X 16 character alpha-numeric display, CTCSS/DCS operation, multiple tuning step sizes including the new 7.5 kHz step now prevalent in VHF, 10 service searches, repeater reverse, beep alert, multiple delay options, and much, much more.

❖ Icom IC-R3

All we know of this nifty new handheld is what we've seen in the ads on the back of *Monitoring Times* – and we sure do like what we see: The first scanner ever with a TV screen built-in. For this editor, personally, I'll fall in love with the ability to go to a ballgame and be able to watch the Red Sox on TV while I listen to the security operations at the park.

❖ Scanner Master SmartLink

SmartLink, developed by this editor's firm, Scanner Master, under the engineering direction of Terrence Brennan and Sean Sullivan, allows Bearcat 245 owners to Reaction Tune and store frequencies received by the Optoelectronics Scout, Multicounter, and similar frequency counting devices. SmartLink also allows you to scan frequencies you've already programmed while you reaction tune and store frequencies you receive locally on your counter. The device actually has over 60 modes of operation.

Depending on the reaction to our discussing new products, perhaps at the end of the year we'll nominate products for Scanner of the Year and Scanner Accessory of the Year. If you have other new products you would like us to cover, please just let us know.

❖ Association of Public-Safety Communications Officials

A great web site to check every now and then is that of APCO, the Association of Public-Safety Communications Officials at **www.apcointl.org**. If you're a scanner user and you haven't heard of this group before, you should really spend some time learning more about them.

APCO, in existence since 1935, is comprised of public safety communications professionals as well as communications industry leaders who serve them. These are the police, fire, EMS, emergency management and other radio officers whose influence goes far to determine the types of radio systems purchased and operated by their departments. APCO members crafted the APCO-25 standard that is the basis of most new digital radio systems implemented today.

APCO recently posted news on their web site regarding some of the 12.5 kHz UHF splinter channels. While UHF splinters are now being licensed for full power operation, this document requires that if low-power operations preexist on one of the below-listed frequencies in a given area, they will take precedence over any application for full-power use of the channels.

Newly Established Low Power 12.5 kHz UHF Channels

Per FCC Document 97-61, the PSCC coordinators agreed to the following UHF offset channels, to remain at permanent low power primary status:

453/458.0375	453/458.9375
453/458.0625	453/458.9625
453/458.0875	453/458.9875
453/458.1125	460/465.4875
453/458.1375	460/465.5125
453/458.8875	460/465.5375
453/458.9125	460/465.5625

The new emission designator for 12.5 kHz channels is 11K3F3E. The APCO site also contains a link to Percon's excellent on-line FCC database research service, which you can use to see who is currently licensed for these frequencies in your area. Check it out!

The APCO site also provides interesting news in public safety communications. Two recent stories on their home page addressed Public Safety Telecommunications Week (the week of April 9th), which honors the many telecommunications professionals who aid in providing 9-1-1 emergency assistance to citizens everywhere. The second story addressed the spate of computer viruses plaguing 9-1-1 centers. The virus, found initially in Houston, was said to be erasing hard drives and clogging 9-1-1 lines. This is where the Internet really shines. The rapid dissemination of such information was certainly critical in helping other centers across the country protect their 9-1-1 systems from imminent collapse.

❖ APCO 2000 Convention

APCO's yearly international convention will be held this August in our favorite city, Boston. Your scanner columnist will be there in Booth #204 and I hope some of our readers will have a chance to make it to the show and will stop by the booth for a visit. The APCO convention is a great place to see all that is new in public safety communications, particularly demonstrations of trunked and digital radio systems operating right on the show floor. You do need to be involved in public safety and/or communications in some fashion, but if you are, check out APCO's web site, or call them in Daytona Beach, Florida, for details on attending the convention.

Here's the first half of a primer on monitoring in Boston during the convention:

Boston APCO-2000 Convention Monitoring

Boston Police (KCA860 - 118.8 PL)

460.350	-F1-	Citywide Emergency; Tactical; Special Events
460.450	-F2-	Area "A" (ALPHA) Operations
460.225	-F3-	Area "B" (BRAVO) Operations
460.400	-F4-	Area "E" (ECHO) Operations
460.500	-F5-	Area "D" (DELTA) Operations
460.175	-F6-	Area "C" (CHARLIE) Operations
460.300	-F7-	Car to car/Station to car/secondary
460.125	-F8-	"Harry Base" Information requests
460.075	-F9-	Investigations (VICTOR)
460.250	-F10-	Detectives/Headquarters/Command
460.375	-F11-	Investigations (encrypted)
460.050	-F12-	Special Operations Division (D-343)
460.150	-F13-	Tac 13 Investigations
460.275	-F14-	Tac 14 Investigations

460.475	-F15-	Command (encrypted)
460.250	-F16-	Radio Shop, Command Post, ESU
453.350	-F25-	Housing Auth. Police (ZEBRA) (D-351)
453.200	-F26-	Service (Auto repair/Facilities)
453.300	-F27-	BHA and EDIC Maintenance
158.910R		Recruits, Special Events (154.860 in)

Area "A"	(ALPHA) -Downtown/Waterfront/Beacon Hill -East Boston/North End/Charlestwn
Area "B"	(BRAVO) -Mattapan/North Dorchester/Roxbury/Mission Hill
Area "C"	(CHARLIE) -South Boston/Dorchester
Area "D"	(DELTA) -Back Bay/South End/Fenway -Allston/Brighton/Kenmore Square
Area "E"	(ECHO) -Jamaica Plain/Hyde Park -Roslindale/West Roxbury

Boston Fire

483.1625	-F1-	General Communications	118.8
483.1875	-F2-	Fireground 1	118.8
483.2125	-F3-	Fireground 2	118.8
483.2375	-F4-	Fireground 3/Constr.	118.8
453.650	-F5-	Apparatus Page Dispatch	131.8
153.890	-F6-	Subway Radio	
154.220	-F7-	Metrofire (simulcasted on 483.2875)	

Boston Emergency Medical Services (EMS)

The new BEMS dispatch center located at the new BPD HQ is staffed by EMT Telecommunicators that have been trained to the APCO Standard for Basic Telecommunicator and Emergency Medical Dispatch (APCO EMD). In addition to processing emergency calls and dispatching BEMS units to the 100,000 incidents yearly, the center also operates the Metro-Boston C-MED system which provides EMS communications for 61 communities around Boston.

462.950	Tac 9	On-scene/Working
462.975	Citywide 10	Boston Operations
458.1375	Tac 11	Simplex communications on-scene
460.550	Tac 12	Secondary for sustained incidents
458.0625	Ch. 13	Simplex sustained incident on-scene
460.525R	Ch. 14	Command Channel (secure voice)
460.525M	Ch. 15	Command Ch. (simplex-secure voice)
453.775	Tac 16	Technical Services Bureau Ops.
155.040R	"040"	Paging/Misc. Use (153.740 input)
868.350		GPS System (vehicle location)

Additional Medical Channels

463.050	MED 3	Ambulance-hospital channel
463.075	MED 4	Common Calling Channel
463.125	MED 6	Ambulance-hospital channel
463.175	MED 8	Ambulance-hospital channel
155.340	HEAR	Amb-Hosp. outside greater Boston
155.280	HEAR	Boston Hospitals Disaster Network
130.575		Boston Med Flight
460.800		Boston Med Flight -Boston (114.8)

State & Federal Agencies in Boston

417.200	Government Buildings Security (GSA)
166.950R	National Historic Park (F1 rptr./F2 smplx.)
(141.3	National Historic Park (F3) (D-532)
162.475	NOAA Weather

Sports & Events & Attractions

463.325	Boston Red Sox -Security- F1	103.5
464.075	Boston Red Sox -Security- F2	103.5
463.3625	Boston Red Sox -Park Operations	71.9
463.3875	Boston Red Sox -Concessions	71.9
463.4125	Boston Red Sox -Media Coordination (also: 461.1375, 462.575, 466.3875)	
935.225	Fleet Center Operations (& 935.9125, 936.9125, 938.900)	
484.0125	Aquarium Security (156.975 Boat Docking)	
461.9125	Aquarium (& 463.2875/154.570 Parking)	
464.375	Fanueil Hall Security	

More to come next month.

Utah Scanning

A state which doesn't get much respect as a scanning haven is Utah. Utah may be a relatively small state as far as population goes, but Salt

Lake City is a major metropolitan region with a wide variety of communications services. The region is also home to a core group of very active buffs, including Jon S. Van Allen, KF7YN, who has led a group that has created an excellent web site devoted to scanning in the region; you can find it at **http://www.real-utah.com/scan/index.html.**

Jon was kind enough to provide a sampling of some of his data on the Salt Lake City region; you can find his comprehensive profile of Salt Lake City scanning in last month's cover feature. What we really like about the information is the breakdown of how the dispatch centers provide communications services for the various communities. This is the type of data that is not a matter of FCC records and is thus generally quite hard to find.

Valley Emergency Communications Center (VECC) Consolidated dispatch center for the following:

Midvale Police Fire / Rescue / Med
Murray Police / Fire / Rescue / Med
Sandy City Police / Fire / Rescue / Med
South Jordan Police / Fire / Rescue / Med
West Jordan Police / Fire / Rescue / Med
West Valley City Police / Fire / Rescue / Med
Salt Lake County Fire
Bluffdale Fire / Rescue / Med
Riverton Fire / Rescue / Med
Draper Fire / Rescue / Med

Dispatch of Fire and rescue units is all done on channel 1 to all areas covered by VECC. One only needs to monitor Dispatch or the Plectron callout channel for all Fire & rescue calls. Units are directed to respond on Ch-2 or 3. On scene comms are on Tac Channels 4 through 10. Individual agency channels are for paging or fireground operations, otherwise all units monitor dispatch. Police frequencies are listed separately as they are dispatched separately.

Valley Emergency Communications Center Fire and Rescue

153.890 Fire & Rescue Dispatch
154.385 Municipal Paging
154.175 Response Channel 2
154.415 TAC 10
153.770 Response Channel 3
155.955 Police TAC
154.130 TAC 4
154.280 Mutual Aid Statewide
154.220 TAC 5
154.340 Salt Lake County Fire, Fireground (SLC Fire F-3)
154.235 County Paging (Plectron gongs)
155.505 Statewide Police Mutual Aid
154.250 TAC 6
155.340 HEAR Channel, Ambulance to Hospital
154.265 TAC 7
153.845 Sandy City Fire
154.295 TAC 8
154.965 Sandy City Fire
154.355 TAC 9

Statewide County Designators for Salt Lake County (I as in India)

1-India - Salt Lake County
10-India - West Jordan
2-India - Salt Lake City
13-India - Draper
3-India - Murray
14-India - South Jordan
4-India - Kearns
15-India - Riverton
5-India - West Valley City
16-India - Copperton
6-India - Magna
17-India - Lark
7-India - Midvale
18-India - Bluffdale
8-Inida - South Salt Lake
19-India - Herriman
9-India - Sandy
20-India – Alta

Kansas City, Here we Scan

Scanner fans and public safety professionals have heard a lot about communications Kansas City in recent years. Their trunked system was reportedly not providing the coverage that police and fire officials had assumed it would. Incidents of officers in trouble who could not hit a repeater site were much publicized by the press.

We haven't heard a repeat of such situations in some time, however. With the release of the Bearcat 245XLT, the PRO-94, and subsequently the PRO-92 and PRO-2052, it is now possible to scan EDACS trunking systems and thus, finally, Kansas City. This information submitted by Mike Wasleski on the Kansas City System.

Type: G.E. Ericsson (EDACS)

Use: Kansas City Police, Fire, EMS, Airport, City Services

Frequencies:

(1) 856.2125 (2) 857.2125 (3) 858.2125 (4) 859.2125 (5) 860.2125 (6) 856.4625 (7) 857.4625 (8) 858.4625 (9) 859.4625 (10) 860.4625 (11) 856.2625 (12) 857.2625 (13) 858.2625 (14) 859.2625 (15) 860.2625 (16) 856.7375 (17) 857.7375 (18) 858.7375 (19) 859.7375 (20) 860.7375 (21) 856.4375 (22) 857.4375 (23) 858.4375 (24) 859.4375 (25) 860.4375

Kansas City Fire/EMS:

08-000 KC Fire (Fleet Call)
08-021 KC Fire (Dispatch)
08-022 KC Fire (Marshall 1)
08-023 KC Fire (Marshall 2)
08-024 KC Fire (Fire Training 1)
08-025 KC Fire (Fire Training 2)
08-026 KC Fire (Fire Training 3)
08-027 KC Fire (Mutual Aid)
08-031 MAST (EMS Dispatch)
08-041 KC Fire (TAC 2A)
08-061 KC Fire (TAC 3A)
08-081 KC Fire (TAC 4A)
08-101 KC Fire (TAC 5A)
08-102 KC Fire (TAC 5B)
08-121 KC Fire (TAC 6A)
08-122 KC Fire (TAC 6B)
09-041 KC Fire (TAC 7A)
09-061 KC Fire (TAC 8A)
09-021 Emergency Preparedness
09-031 Emergency Prep. (KC Fire - NWS)

Police:

10-000 KCPD (Agency Call)
10-020 KCPD (Fleet Call)
10-021 KCPD (Central Zone)
10-022 KCPD (Metro Zone)
10-023 KCPD (East Zone)
10-025 KCPD (North Zone)
10-026 KCPD (South Zone)
14-137 KCPD (North/South Zone)
10-027 KCPD (Tactical)
10-055 KCPD (Mutual Aid)
10-045 KCPD (Special Ops #3)
10-046 KCPD (Special Ops #4)
10-047 KCPD (Special Ops #5)
10-050 KCPD (Special Ops #6)
04-121 KCPD (Tow Trucks)
10-057 Missouri Sheriffs' Network

Airports:

12-040 KCI (Fleet Call)
12-041 KCI (Police)
12-061 KCI (Operations)
12-062 KCI (Emergency 1)
12-063 KCI (FM 2)
12-064 KCI (FAC 1)
12-065 KCI (FAC 2)
12-066 KCI (Ground Transportation)
12-067 KCI (Shuttle Bus)
12-082 Downtown Ground
12-101 Richards Gebaur

City Administration:

02-021 Admin (Traffic Ops)
02-022 Admin (District 1)
02-023 Admin (District 2)
02-024 Admin (District 3)
02-025 Admin (District 4)
02-026 Admin (District 5)
02-031 Admin (Tow Lot)
02-041 Public Works (Dispatch)
02-062 Solid Waste
02-081 Engineering
02-101 Operations (Field Ops)
02-102 Operations (Building Ops)

City Services:

04-021 Parks and Recreation (District 1)
04-022 Parks and Recreation (District 2)
04-023 Parks and Recreation (District 3)
04-024 Parks and Recreation (District 4)
04-041 Golf Courses (SW Club)
04-042 Golf Courses (SW Maintenance)
04-046 Golf Courses (MN Maintenance)
04-047 Golf Courses (HP Club)
04-061 Horticulture
04-081 Zoo
04-082 Zoo (Special Services)
04-083 Zoo (Ops 1)
04-084 Zoo (Ops 2)
04-085 Zoo (Ops 3)
04-087 Zoo (Services)
04-090 Zoo (Supervisors)

Other:

06-021 Animal Control
06-046 Health Department (Ops)
06-060 Municipal Auditorium/Bartle Hall (Fleet Call)
06-061 Municipal Auditorium/Bartle Hall (Dispatch)
06-062 Municipal Auditorium/Bartle Hall (Security
06-063 Municipal Auditorium/Bartle Hall (Ops)
06-064 Municipal Auditorium/Bartle Hall (Park)
06-081 Kemper Arena
06-083 Kemper Arena (Ops)
06-101 Neighborhood Preservation
06-121 Municipal Corrections (General Ops)
06-123 Municipal Corrections (Court)

Radio Sparks

We'll move back west again with some anonymous information sent to us on the Sparks, Nevada, trunking system. We hope one of our readers can fill in some of the blanks on the talkgroup list.

City of Sparks Nevada Trunked Radio System (Motorola Type II)

Frequencies:

856.2125 857.2125 858.2125 859.2125 860.2125 859.7125 860.7125

Talk Groups

16 Police - Main
48 Police - Tac 1
80 Police - Tac 2
112 Police - Tac 3
144 Talk Around
304 Police - Tac 4
336
400 Fire - Main
432 Fire - Tac 1
464
496 Fire - Tac 3
528 Fire - Tac 4
592
656 Public Works - Admin
688 Streets
720 Lines (sewer, water, etc)
784 Traffic
816 Buildings
848
880
912
944
976 Parks
1200
1232 Fire - Pre Alert
1296
2064
6544
8240
11280
12304
32816

Scanner Logs

SCANNING REPORT

Larry Van Horn
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ReLAX

Ken Hawkins passes along a correction to our April 2000 column and some additional frequencies. In the *Scanner Logs,* Southern Cal to Mexico frequencies, there is one small error: the first frequency listed as LAX Center (134.35) is actually a second LAX departure frequency.

Ken also passes along these frequencies for the LAX departure area:

Malibu sector	125.2-385.2
Manhattan sector	124.3-363.2
Newport sector	134.35-398.95
Catalina sector	127.4-397.95
Laker sector	134.9

Phoenix Air Cargo

From an anonymous contributor via email come the following frequencies for Ontario Aircraft Service. They handle all the air cargo aircraft at Phoenix Sky Harbor International Airport in Arizona – everything from Emery to UPS to the US Post Office planes. The frequencies are: 464.7125, 466.1125, and 466.4875 MHz.

California Skip

Sol Elbaum in the Bronx, NY, reports hearing California Highway Patrol communications via VHF-low band F-2 skip on 42.06, 42.08, 42.44, 42.46, 42.50, and 42.54 MHz. Sol also monitored Nevada Highway Patrol dispatch on 42.94 MHz. Signals levels were very strong during his early afternoon Eastern Time.

Florida Milair

Jack NeSmith is back with another Florida milair report.

263.000	FAA Jacksonville ARTCC
265.650	Unid (*US Army allocation-LVH*)
270.850	Unid (*US Navy/Marine Corps allocation-LVH*)
278.000	USMC? (*Could be any number of folks. This is the US-Russian dangerous military activity coordination frequency-LVH*)
283.700	USAF Avon Park Range
302.400	USAF/NORAD SE US Air Defense - Oakgrove
324.025	Unid (*One of my spectrum holes, watch closely-LVH*)
325.725	Unid (*USAF 71FS out of Langley has been reported here-LVH*)
349.400	Air Mobility Command
384.775	Unid (*One of my spectrum holes, watch closely-LVH*)

Maryland State Police

Ron Perron provides low band skip enthusiasts with this profile of the Maryland State Police VHF low band system

Freq (MHz)	Channel	Barracks
39.10	1	Headquarters, Pikesville
39.25	2	Headquarters, Pikesville
39.30	3	College Park "Q"
39.34	4	Bel Air "D", Forestville "L", Hagerstown "O"
39.14	5	Annapolis (State Capitol) "J"
39.32	6	Rockville "N", Centreville "S"
39.38	7	Security "K", Valley"R", Leonardtown "T"
39.24	8	Cumberland "C", Waldorf "H", Berlin "V"
39.52	9	Westminster "G", Prince Frederick "U"
39.04	10	Glen Burnie "P"
39.06	11	Jessup "A", Salisbury "E"
39.44	12	
39.20	Marine	
39.22	Marine	
44.74	Helo	
47.66	Helo	

Md State Police Identifiers

Patrol cars carry a # or ## number prefixed by the Barracks letter, e.g. P-04 is from the Glen Burnie Barracks. The helicopters on 44.74 use the callsign Trooper 1-8 and are controlled by a coordination center using the callsign SysCom. Marine units use the callsign Rescue # or ## are used for law enforcement and rescue operations on the Chesapeake Bay and its tributaries.

You'll know if you're hearing the MSP if you hear patrol cars mentioning the following major highways: Interstate (I) 95; I-97; I-83; or 495 (Washington DC Beltway) or 895 (Baltimore Beltway); Harbor Tunnel; Ft McHenry Tunnel; Francis Scott Key Bridge; Chesapeake Bay Bridge; or Baltimore-Washington Parkway (I-295).

Italian Skip Logs

My old friend Ciccio in Italy sends along more great VHF-low band logs:

31.340	KA5850 Forestry Conservation, unknown location, probably North Carolina. OM/EE weather forecast at 1402.
31.540	KIF382 Forestry Conservation, Asheville, NC OM/EE weather forecast and aircraft/helicopter availability at 1428.
31.700	KQC518 Forestry Conservation, Fairmont, WV at 1406.YL/EE weather forecast.
31.975	Unidentified OM/Chinese at 0928.
32.025	In-house pager. unidentified from the east at 0853.
32.425	Unidentified OM/Chinese. I suppose these are all from the same user at 0940.
32.825	Unidentified OM/Chinese. I suppose these are all from the same user at 0940.
32.850	Unidentified OM/Chinese. I suppose these are all from the same user at 0940.
32.950	Unidentified OM/Chinese. I suppose these are all from the same user at 0940.
32.950	Unidentified OM/Chinese. I suppose these are all from the same user at 0940.
33.220	KQB406 Buckeye Pipeline Company, Cygnet, OH with CW ID at 1421.
33.250	Unidentified POCSAG pager, weak and coming from the east at 0950.
33.380	KNHD660 Columbia Gas Transmission Corp, Culloden, WV with YL/EE asking for a "second pressure increase" at 1611.
33.425	CMQP90 Ministerio de Agricultura, Cuba. Unidentified location heard at 1545. YL/SS calling CMQP926 and inviting the chief of the office at a meeting of the government generals in the afternoon at the province office. At 1555 CMQP94 Ministerio de Agricultura, Cuba a unidentified location with an OM/SS calling CMQP906 and giving the same message as above.
33.740	WNAL734 Rockingham County Fire, Harrisonburg, VA with CW ID at 1615.
33.780	KEJ451 Ocean County Fire, Toms River, NJ with OM/EE dispatching a brush fire at 1715.
33.860	KGF801 Susquehanna County Fire, Montrose, PA with OM/EE dispatching a brush fire at 1753. United Fire Company personnel due to respond.
33.900	KJY884 Chester County Fire, West Chester, PA with OM/EE dispatch person with chest pain at 1332. KQI316 Hamilton County Fire, Cincinnati, OH CW ID just under Chester County Fire dispatch above at 1332.
33.980	KDG843 Crooksville Fire Station, OH receiving dispatch from KFR674 Perry County Fire, New Lexington, OH about fallen injured child in Crooksville at 1411.
34.375	Unidentified repeater (probably Russian) opened with OM/chinese chatting at 1000. Can hear this one daily on 34.350 and 34.325 also.
34.950	Male in Hebrew, good strong signal at 0935. One was a vehicle, with motor and cabin noises on the background. Voice broken by street hollows.
35.100	KCR630 General Motors Research Corp, Pontiac, MI with CW ID at strong levels at 1709.
35.425	Male in unidentified language sounds like Farsi or Urdu. Raspy hum like in military equipment at 1035.
36.250	Male in unidentified language (possibly Turkish) at 1044. Calling "Elliver" (or similar) over and over.
36.800	Male in Hebrew exactly the same as 34.950. Mobile station with noises on the background at 0930.
39.400	Male in Russian. Repeater open with noises at 0845.
40.500	Male in English (with Asian accent) announcing "1 dot 1 dot 37 dot 2 dot 9" at 0934. Suspect this is the same user as 40.950.
40.950	Male in English (with Asian accent) seems Indian "Yenko calling Dankjung" (or similar), short number count test and radio check. Also calling another unidentified at 0758. No further traffic after that, but seems to be quite interesting.
40.975	Unidentified repeater opened with noises and fragments of male in Chinese at 0750. Suspect same user as 40.950.
40.989	Male in Arabic on cordless phone at 0841.
42.1575	Male in Arabic on cordless phone at 1013.
43.000	Male in English (British accent) requesting phone patch to unident with middle eastern accent at 0837. Very short patch and off. Suppose this one is the same user as 43.025 to 43.150, 25 kHz steps.

Till next month, good hunting and send those logs to *larry@grove-ent.com* or PO Box 98, Brasstown, NC 28902.

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US Air Force Air/Ground Net Takes Shape

SCOPE stands for System Capable of Planned Expansion, as in SCOPE Command. It's the US Air Force's ongoing plan to bring order to its confusion of high-frequency (HF) radio networks. Final certification of the resulting system, which will be mostly automated and controlled from Andrews Air Force Base in Maryland, is still a couple of years off.

While the existing Global High Frequency System (GHFS) is still very much in use for routine phone patches, the new setup is starting to take over some of the direct-dialed calls. Most are tests, but we're seeing more of the real thing.

These are spooky to hear. Instead of the familiar, "I have your party on line, please initiate," we hear only the mechanical bleeping of Automatic Link Establishment (ALE) controllers, followed instantly by a dial tone. In a fraction of a second, far less time than manual dialing would require, the call connects and the ground party is simply there.

Confirmed frequencies for the new system are: 3059, 3137, 4721, 5708, 6715, 6721, 7632, 8965, 9025, 9057, 11226, 11250, 13215, 15043, 18003, 20631, 23337, and 27870 kilohertz (kHz), all upper sideband (USB). ALE controllers pick the best frequency, as measured in those "soundings" they're always doing. In other words, even though it's best to scan them all, the usual HF propagation rules apply.

❖ Hidden ALE Messages

Quite a few people are now decoding ALE bursts with Charles Brain's incredible PC-ALE program we've mentioned here before. While Charles recommends disabling the "trace" option, which he put in as a debugger, turning trace on finds some rather interesting things.

Best are the AMD (Automatic Message Display) "words." (In ALE, a word is one of those information units that PC-ALE puts in brackets.) Many ALE radios and controllers show these on alphanumeric displays, like larger versions of the ones we see on message pagers.

AMD is provided so operators can pass those little "orderwire" messages so essential to any comm system. These are the "WHAT'S YOUR STATUS?" and "GIMMIE A CALL" type of chatter used by radio people since Marconi's time. Even in ALE, the whiz-bang automation of all time, we humans find a way to talk to each other.

These messages use a 64-character subset of the American Standard Code for Information Interchange (ASCII), the same code used by personal computers to display text on screen. It's a bit like old, 6-bit RTTY, with capital letters, numbers, the space, and limited punctuation.

AMD is way more interesting than mere opchat, however. We've seen quite a few phone numbers passed in the AMD word, at least partially answering the question of how these patches are being set up. It's apparently not the only way, but it sure looks like one of them.

❖ ALE Network Commands

It gets better. ALE uses a less visible structure to pass its network commands. These display in PC-ALE's trace mode as "CMD," the standard command prefix, followed by such apparent gibberish as "61 7E 7E."

The paired figures after CMD are computer bytes in hexadecimal (base-16) notation. Programmers understand this sort of geek-speak. Everyone else need only look at my handy table, which follows.

At least the first byte is always the computer code for an ASCII character, usually a lower-case letter. 61, for example, is the letter "a," which stands for "analysis." In this case, the following data, in binary bits, is ALE's version of a signal report.

❖ ALE commands

These are the first code (byte) seen after the CMD. Not all letters are documented in the ALE standard. "Cyclic Redundancy Check," CRC, is a place to put error-checking information, if needed.

ASCII	Hex	Command
(Var)	20-59	Automatic Message Display
‘	60	Advanced analysis (LQA)
a	61	Analysis (LQA)
b	62	Data block analysis
c	63	Channels
d	64	Data Text Message
f	66	Frequency selection
m	6D	Mode selection
n	6E	Noise Report
p	70	Power control
r	72	Request LQA
t	74	Time scheduling
v	76	Capability or version
x	78	CRC
y	79	CRC
z	7A	CRC
{	7B	CRC
|	7C	User functions
~	7E	Time exchange

BR Chirpsounder

❖ More Hidden Stuff

As long as we're talking about hidden messages on today's hot-rod HF equipment, we might as well mention Chirpcomm.

Everyone's heard that sudden DWEEEEEEP blipping across the radio's passband, usually in the middle of picking some weak utility out of the noise. It's the distinctive sound of the descriptively named Chirpsounder. This is a propagation sweeper made by BR Communications, a division of TCI in California.

Most Chirpsounders are at military bases, but they're becoming more common in civilian applications such as basic research, or real-time control of advanced, adaptive, HF radio systems. BR makes a receiver which locks onto the sweeping carrier, continually records its strength, and follows it from 2 to 30 megahertz at a relentless 100 kHz per second. It can be located at the end of a path under test, or near the transmitter for vertical soundings.

All well and good, but where's the hidden message? It's in Chirpcomm. This quick-and-dirty, spread-spectrum mode embeds a message up to 40 characters long in the rising sweep. Again, it's intended mostly for orderwire functions. Synchronized sounding receivers get the message. We get chirped.

Hugh Stegman

Abbreviations used in this column

AFB	Air Force Base
ALE	Automatic Link Establishment
AM	Amplitude Modulation
ANG	Air National Guard
ARQ	Automatic Repeat Request teleprinting system
ARQ-E3	Single-channel ARQ teleprinting system
CAMSLANT	Communication Area Master Station, Atlantic
CANFORCE	Canadian Forces
CIA	US Central Intelligence Agency
CW	Morse code telegraphy ("Continuous Wave")
DEA	US Drug Enforcement Agency
EAM	Emergency Action Message
FACSFAC	Fleet Area Control and Surveillance Facility
FAPSI	Federal Agency for Government Communications & Information
FAX	Radio Facsimile
FEC	Forward Error Correction teleprinting system
HMS	Her Majesty's Ship (UK)
MARS	Military Affiliate Radio System
MFA	Ministry of Foreign Affairs
MI6	British Military Intelligence, group 6
MWARA	Major World Air Route Area
NATO	North Atlantic Treaty Organization
NUCO	Numerical Code (US Navy number passing)
PR	Puerto Rico
R3E	Reduced-carrier single-sideband emission
RSA	Republic of South Africa
RTTY	Radio Teletype
SAM	Special Air Mission
SHARES	Shared Resources
SIS	Secret Intelligence Service (Like British "MI6")
UK	United Kingdom
Unid	Unidentified
US	United States
USN	US Navy
USS	United States Ship
VOLMET	Aviation weather observations

All transmissions are USB (upper sideband) unless otherwise indicated. All frequencies are in kHz (kilohertz) and all times are UTC (Coordinated Universal Time). "Numbers" stations (encrypted, usually unidentified, broadcasts thought to be intelligence-related) are identified in () with their ENIGMA station designators, as issued by the European Numbers Intelligence Gathering and Monitoring Association.

335.0 FEP-Nondirectional navigation beacon, Freeport, IL, in AM at 0602. (Sue Wilden-IN)

338.0 Metropolitan-Nondirectional beacon, Indianapolis Metro Airport, AM at 0623. (Wilden-IN)

2283.0 Unid-Station with bell-like tones, then repeating CW letter "O" at 0545. (Wilden-IN)

2500.0 BPM-Xian, China, standard time beeps and identifier, in CW at 1350. (Takashi Yamaguchi-Japan)

2598.0 Canadian Coast Guard, Stephenville, with Marine Information Broadcast in French at 0220. (Ron Perron-MD)

3167.0 Uniform 2-Probable US military, in a large net with Golf 9, 6 Yankee, 9 Echo, and control station "N-6-D," using Navy NUCO/Un-NUCO procedures, at 0216. (Perron-MD)

3496.0 L8BM-Unknown CW station, repeating this possible identifier or callup, at 1200. (Yamaguchi-Japan)

4023.5 3BZ-Plaisance Air, Mauritius, with Notices To Airmen in ARQ-E3, at 1730. (Bob Hall-RSA)

4372.0 "K-5-S"-US Navy, working a medical emergency with Giant Killer (Facsfac, Oceana, VA), at 0042. "3-S-X"-Military vessel in "Delta Foxtrot" tracking net, asking Giant Killer the status of "Dolphin," at 0139. (Perron-MD)

4739.0 Wafer 751-US Navy P-3C, with Spare Group report for Golden Hawk (USN, Brunswick), at 0446. (Perron-MD)

5097.0 CFH-Canadian Forces, Halifax, with RTTY markers at 0419. (Hall-RSA)

5117.0 Unid-Began as Cuban "Cut number" Morse code (M8a), but in audio modulating an AM carrier at 0200. A few minutes later, abruptly cut to the Cuban "Atencion" (V2a), with voice "numbers" in progress, having missed the callup. Morse "numbers" started up on the usual 10235.5 CW. (John Maky-AR) *Well, well well; another triumph in Cuban studio engineering. Seriously, I've heard this too, and if it doesn't prove that M8 is audio-keying the same transmitters used by the V2 voice numbers, and probably also by Radio Havana, I don't know what will. - Hugh*

5277.0 Panther-DEA, Bahamas, calling Coast Guard 15C, on what he called the "Alpha" frequency, while 5841 was "Bravo," at 0404. (Perron-MD)

5530.0 MIW2- Mossad, Israel, with phonetic callup only (E10a), at 1515. (Yamaguchi-Japan)

5696.0 CAMSLANT Chesapeake-US Coast Guard, diverting Coast Guard 19C, a helicopter, to a distressed vessel at 0240. (Allan Stern-FL) US Coast Guard Rescue 1720, large rescue with CAMSLANT, also using 10991.6, at 0355. (Perron-MD)

5699.0 Pipeline-Unknown station, in position reports and comm checks with Canadian Forces Gonzo 5B, Gonzo 5C, and Gonzo 6D, at 0224. (Perron-MD)

5841.0 Coast Guard 19C-US Coast Guard aircraft, working Panther (DEA, Bahamas), at 0215. Coast Guard Rescue 6019-USCG H-60, giving position to Panther, at 0334. (Perron-MD)

6224.0 ZLM-Taupo Radio, New Zealand, with marine weather at 0900. (Yamaguchi-Japan)

6270.0 ULX-Mossad, Israel, with phonetic callup and "numbers" message (E10), at 1430. (Yamaguchi-Japan)

6370.0 SYN2- Mossad, Israel, with phonetic callup only (E10a), at 1545. (Yamaguchi-Japan)

6379.0 4XZ-Israeli Navy or intelligence, Haifa (M22), with CW marker at 1516. (Yamaguchi-Japan)

6408.5 ZSO-South African Navy, Durban, using a new 32-tone mode previously unheard anywhere, at 0619. (Hall-RSA)

6480.0 YHF-Mossad, Israel, with phonetic callup and "numbers" message (E10), at 2000. (Yamaguchi-Japan)

6484.5 XSV-Tiajin Radio, China, working a vessel in CW, at 1525. (Yamaguchi-Japan)

6575.0 HNC6-Rare Mossad, Israel, callup only at 1445. (Yamaguchi-Japan)

6604.0 New York Radio, VOLMET and weather warnings at 2302. (Wilden-IN)

6658.0 CIO2-Mossad, Israel, with phonetic callup only (E10a), at 1845. (Yamaguchi-Japan)

6697.0 MKL-Royal Air Force, UK, working aircraft "Z-8-Y" at 0324, and aircraft "5-Q-M" at 0335. (Perron-MD)

6712.0 Circus Vert-French Air Force, working aircraft in French at 0042. (Perron-MD)

6745.0 KPA2- Mossad, Israel, with phonetic callup only (E10a), at 1415. (Yamaguchi-Japan) MIW2-Mossad, Israel, with phonetic callup only (E10a), at 2142. (Dean Burgess-MA)

6761.0 Hypnotize-US military, in several unsuccessful attempts to pass encrypted RTTY-like signals with Andrews AFB, MD, also several ALE bursts, starting at 0205. (Perron-MD)

6779.0 DRES-German Navy vessel *Weiden*, Mine Hunter M-1060, calling DHJ 59 (German Navy, Wilhelmshaven), with voice and RTTY, no joy on either, at 0140. (Perron-MD)

6795.0 "Duke"-British Royal Navy HMS *Norfolk*, calling "Lightning Strike" (USS *Mitscher*), part of a large joint exercise, at 0045. (Perron-MD)

6959.0 Lincolnshire Poacher "numbers" (E3), British MI6/SIS, Cyprus, at 2139. (Burgess-MA)

6986.0 ART-Mossad, Israel, with phonetic callup and "numbers" message (E10), at 1500. (Yamaguchi-Japan)

7337.0 Lincolnshire Poacher "numbers" (E3), British MI6/SIS, Cyprus, parallel on 9251, at 1900. (Yamaguchi-Japan)

7506.1 ZSJ- South African Navy, Silvermine, with FAX weather and ice charts, parallel on 13536.1 and 18236.1, at 0625. (Hall-RSA)

7625.3 HZN67-Jeddah Meteorological, Saudi Arabia, with coded weather observations in RTTY, at 1757. (Hall-RSA)

7811.0 SYN2-Mossad, Israel, with phonetic callup only (E10a), at 1345. (Yamaguchi-Japan)

7918.0 YHF2-Mossad, Israel, with phonetic callup only (E10a), at 1430. (Yamaguchi-Japan)

Utility Logs (continued)

8025.0 CIO2-Mossad, Israel, with phonetic callup only (E10a), at 1345. (Yamaguchi-Japan)
8335.0 DRAT-German Navy *Emden*, a frigate, working DHJ 59 (German Navy, Wilhelmshaven), at 0224. DRES-German Navy *Weiden*, radio checks with DRJM, *Garnele*, a landing craft, at 0101. (Perron-MD)
8495.1 CLA-Havana Radio, Cuba, with CW marker. (Wilden-IN)
8537.9 RFTJE-French Forces, Africa, formerly "6WW," testing in RTTY at 0444. (Hall-RSA)
8581.7 PWX33-Rio de Janeiro Radio, Brazil, with weather codes in RTTY, at 0616. (Hall-RSA)
8739.0 Cyprus Radio-Cyprus, repeating voice mirror for telephone service, at 2158. (Burgess-MA)
8776.0 Athens Radio, Greece, with telephone calls in Greek, at 0258. (Perron-MD)
8844.0 Unid-Two shrimp boats discussing lousy fishing, sounded like Gulf of Mexico from accents, at 0316. (Perron-MD)
8939.0 Moscow Radio, with Russian language VOLMET at 0322. (Perron-MD)
8957.0 Shannon VOLMET-Shannon, Ireland, with air weather at 2210. (Burgess-MA)
8971.0 Scorpion 04-Possibly a US P-3C, coordinating "Alligator" (link-11 tracking) with Blue Star (USN, Roosevelt Roads, PR), at 0124 (Perron-MD).
8972.0 Tiger Control-Unknown Latin American military, also called self "Tigre," working Tiger 25 at 0712. (Haverlah-TX)
8983.0 Coast Guard Rescue 1716-US Coast Guard HC-130, asking CAMSLANT to relay to Port Canaveral that flares were deployed, at 0035. (Perron-MD)
8992.0 Reach Victor 7-US Air Force, in patch via Ascension to Sigonella for arrival, at 0241. (Perron-MD)
9110.2 NMF-US Coast Guard, Boston, MA *[remote from NMN CAMSLANT Chesapeake –Hugh]*, with FAX weather charts at 0410. (Hall-RSA)
9205.0 CIA Counting Station (E5), with callup "090," then count 1-0, then "numbers" message with 5-figure groups in 3/2 format, at 0311. (Perron-MD)
9270.0 VLB2-Abnormal Mossad transmission, Israel (E10a), repeated phonetics for over 30 minutes after 1430. (Yamaguchi-Japan)
9962.0 Cuban "Atencion," Spanish "numbers" (V2) in AM, new frequency, at 0400. (Maky-AR)
10355.0 4XZ-Israeli Navy or intelligence, Haifa (M22), with CW marker at 1526. (Yamaguchi-Japan)
10495.0 Cuban "Atencion," Spanish "numbers" (V2) in AM, at 2000. (Jay Steimel-AR)
10665.0 CIA Counting Station, Spanish "numbers" (V5), with a possible parallel or receiver image on 4840, in R3E, at 0300. (Steimel-AR)
10780.0 Cape Radio-US Air Force, Cape Canaveral, FL, telling "George Washington," possibly the Navy vessel, and King 1, an aircraft, that a space shuttle launch was on indefinite weather hold, at 1802. (Steimel-AR)
11080.0 SANA-Syrian Arabic News Agency, Damascus, with Arabic news in RTTY, at 1726. (Hall-RSA)
11158.0 "ANG Camp Perry"-US National Guard, OH, at 1532. (Bunyan-MO) *Correction from erroneous location in April Utility Log. -Hugh*
11175.0 Andrews-US Air Force Global High Frequency System, with two EAM, then satisfied operator commented, " There's two of them," at 0614. "Station North"-Unknown, signal showing polar flutter, getting weather for Greenland from Croughton or Thule, at 0807. Hawk 51-US Air Force, calling Gassr 23, a tanker, then a patch via Hickam Global to Hawk Scheduling, then moved to 8992, at 1637. (Jeff Haverlah-TX)
11181.0 PACAF 01-Flight carrying commander of US Pacific Air Forces, in a patch via Hickam to Hickam Command Post, at 0805. Furlough-US military, in net with Pool Hall and others, at 1730. (Haverlah-TX)
11232.0 CANFORCE 3025-Canadian Forces aircraft, giving its departure time to Trenton Military, at 1558. CANFORCE 3015, in patch via Trenton Military, at 1917. (Steimel-AR)
11244.0 Memorial-US military, with nightly test count at 0005. (Haverlah-TX)
11247.0 Gibraltar-British Royal Air Force Flight Watch, with VOLMET at 0039. (Perron-MD)
11300.0 Cairo-Cairo Egypt, in MWARA net, also Khartoum and Mogadishu with various aircraft, at 0315. (Perron-MD)
11306.0 American 2101-American Airlines, working Flight Support, Lima, Peru, at 0341. (Perron-MD)
11454.0 Lincolnshire Poacher "numbers" (E3), British MI6/SIS, Cyprus, parallel on 6959 and 9251, at 1900. (Yamaguchi-Japan)
11565.0 EZI-Mossad, Israel, with phonetic callup and "numbers" message (E10), parallel on 13533, at 1430. (Yamaguchi-Japan)
13242.0 Sulfuric-US military, radio check with Megaphone, at 0212. (Haverlah-TX)
13245.0 Sulfuric-US military, working Panhurst and Over Rate, at 2347. (Haverlah-TX)
13306.0 New York Radio-Atlantic MWARA net, working American 57, American 63, French 301, and Delta 71, at 1631. (Wilden-IN)
13538.0 ZSJ-South African Navy, Silvermine, with FAX schedule of weather charts and RTTY transmissions for the day, parallel on 4014, at 0445. (Hall-RSA)
13907.0 "Service Center"-US military, calling 476 with no joy, then said, "Back to scan," at 2306.
14300.0 KH2TD-Amateur aboard sailing vessel *Hayat*, requiring emergency medical aid for his son, who had been shot with an automatic weapon by pirates off Honduras, thus beginning a large rescue, at 2200. (Bob Puharic-PA) *The boy was saved by Honduran personnel, then ultimately transported to a US hospital with medical and financial help from hams. One of the amateur service's finest hours. -Hugh*
14389.0 AFA4BR-US Air Force MARS, complaining to unheard station about weird whooshing on channel, might have been data or open-circuit noise, at 2021. (Steimel-AR)
14615.0 Moose 71-US Air National Guard tanker, in patch via Ascension to Charleston Command Post to arrange refueling, at 0113. (Perron-MD)
15962.0 Proximate-US military, working Camp Out, left net at 2100.
16985.8 CTP-NATO, Lisbon, Portugal, with RTTY "NAWS *[Notice to all Allied War Ships –Hugh]* de CTP" marker, at 1720. (Hall-RSA)
17350.0 HLS-Seoul Radio, Korea, with "Ode to Joy" and phone patches, at 1213. (Yamaguchi-Japan)
17410.0 EZI-Mossad, Israel, with phonetic callup and "numbers" message (E10), parallel on 19715, at 0930. (Yamaguchi-Japan)
18027.0 Nominate-US military, with EAM, then signal check with Clerical, at 2317. (Haverlah-TX)
18050.0 Unid-FAPSI, Russia (M42), with 5-letter RTTY code groups, at 1700. (Hall-RSA)
20267.5 Unid-FAPSI, Russia (M42), with 5-letter RTTY code groups, at 1634. (Hall-RSA)
21937.7 TAD-Turkish MFA, Ankara, with FEC news in Turkish, at 0510. (Hall-RSA)
22858.5 RFVI-French Forces, Le Port, with ARQ-E3 idler at 0545. EAE220-Madrid, Spain, with coded ARQ message at 1326. (Hall-RSA)
23190.0 RFGW-French MFA, Paris, with a coded embassy circular in FEC, also on 18304.7, at 0614.
23337.0 Gold 31-US or NATO air tanker, calling Andrews at 1824. Expo 91-US Air Force, working Hickam but gave up due to ALE interference, at 1945. (Haverlah-TX)
23370.0 RFGW-French MFA, Paris, with a long FEC message, in French and with plenty of those silly new "C" letter-substitution ciphers, at 1730. (Hall-RSA) *See the May Utility World for an explanation of this odd system. -Hugh*
25040.0 RFGW-French MFA, Paris, with FEC traffic for embassies, at 1657. (Hall-RSA)
26241.7 RFHINVS-French Navy vessel *Nivoise* with RTTY messages in French to French Navy routing indicators RFVIC, RFVIT, and RFFINDI, at 0845. (Hall-RSA)
26441.7 RFFLCVM-French Forces, Toulon, with ARQ-E3 messages at 1535. RFFAAC-Paris, France, with ARQ-E3 traffic for AIG 1957, *[Address Indicating Group – a multiple message delivery. –Hugh]* at 1600. (Hall-RSA)

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Ecoutez vous Francais?

It's been a while since we focused on a diplomatic service and, as they're fast disappearing in readily identifiable form, we thought it good to cover another long-term inhabitant of the HF consular world – the French.

❖ French Diplomatic Service Overview

The French operate a large number of stations from their consulates and embassies across the world – at least 50 countries have been identified and many of them maintain regular, daily contact with the MFA in Paris.

Over the years, the French have employed a variety of digital systems, but during the last decade have settled on FEC-A (FEC-100) and ARQ6-90. Signal shifts are usually 400 Hz with both systems, although with the usual quirks one tends to find with each network, the embassies in Bangkok, Beijing, Islamabad and Moscow use 850 Hz. Like MFA Cairo's transmitters, Paris often uses full carrier between bursts when using ARQ6-90, a method that helps embassies equipped with modest antennas to obtain better copy. Although a network using the Danish-made Thrane & Thrane TT2300b modem was built during 1996, this appears to have been used little.

❖ Frequencies, Callsigns and Habits

MFA Paris can be heard idling for long periods, particularly when using FEC-A, on a number of common frequencies (see Table 1) while acknowledging traffic from its embassies. Remember that the French use both FEC-A and ARQ6-90 in duplex mode, where sending and receiving stations are on different frequencies. So, if Paris is idling on one channel, go hunt for the QSX (return frequency) being used by the sending embassy.

As can be seen in Table 1, French diplomatic channels show a lot of clustering, with the MFA and responding embassies using channels offset a few kHz from a common center frequency. This is the reason for the commonly seen marker tapes used to call-up embassies and alert them to the frequency to be used above ("plus" or "aug") or below ("moins" or "dim") an assigned common channel (see Example 1).

As with many other diplomatic networks, the French use fictitous callsigns for the most part, although these are different according to the system in use. When using FEC-A, the MFA uses "P6Z" for regular traffic or "RFGW" when sending messages to the military attaches present in the destination embassy, and letter-digit-letter trigraphs for the outstations. Four-letter mnemonics, which usually provide a good clue as to the location of the sending or receiving embassy, are used with ARQ6-90 – MFA Paris using "DIPL" in this case. Table 2 has a list of the commonly heard embassies.

NATO-style messaging is generally used with the FEC-A system, and a similar format with ARQ6-90. Messages are often off-line encrypted and sent using five letter groups. Example 2 shows a typical excerpt from an ARQ6-90 transmission:

❖ Who Is It ? (Part 3)

While trawling the bands last weekend, I came across an old but as yet unidentified system which was last heard a couple of years ago. The system is best described as a fast ARQ system, with parameters as follows:

Speed:	250bd
Shift:	170Hz
Burst Interval:	300ms
Autocorrelation:	75 or 150

The system is probably adaptive, since individual frequencies cease sending abruptly, and are then active with very short, irregular single bursts of data which probably constitute the "keep alive" or link check messages. This system has been logged on the following frequencies:

5126.6, 6756.6, 6924.6, 6976.6, 8058.6, 8127.6, 11158.6, 11174.6, 13323.6, 14611.6, 14689.6, 18236.6

❖ UMC Updates

Recently updated at Utility Monitoring Central is the Database section which features hundreds of ALE identifiers and SITOR/TWINPLEX, PacTOR and GTOR selcals in easy to look-up form. Extracts from our logbooks are also available on-line by frequency, or by mode – handy if you're looking to find examples of a system to practice on with your decoder.

As usual, we welcome your comments and suggestions. Until next month, happy listening.

Web Resources

Utility Monitoring Central	www.mindspring.com/~mike.chace/mfatext/France.txt
French Diplomatic Service	www.france.diplomatie.fr
FEC-A Audio Sample	rover.wiesbaden.netsurf.de/~signals/
ARQ6-90 Audio Sample	rover.wiesbaden.netsurf.de/~signals/
TT2300b Audio Sample	rover.wiesbaden.netsurf.de/~signals/
UNID ARQ Audio Sample	rover.wiesbaden.netsurf.de/~signals/

Table 1: Common French Diplomatic Channels

11027, 11037, 11050, 11055, 11070, 11080, 11483, 12384, 13533, 13542, 13551, 13555, 13953, 14508, 14530, 14555, 14558, 14575, 14975, 15668, 15873, 15898, 16130, 16159, 16213, 16236, 16250, 16260, 16263, 16483, 17414, 18203, 18304, 18308, 18380, 18518, 18760, 19261, 19542, 19635

Example 1: Typical French Diplomatic call-up tape

w3s de p6z [Islamabad from Paris]
slt mon vx [salut mon vieux = hello old friend]
je te qap sur la 31 dim 8 [answer me on channel 31 minus 8 kHz]

Table 2: French Diplomatic Callsigns

Embassy	Tactical	Mnemonic	Circuit-ID ITU
Addis Ababa	D7A		
Algiers	H6L		
Amman		AMAN	[AMNX]
Antannarivo	G6F?	TNNR	
Bamako	L9X		
Bangkok	G7M		
Bangui	B1T	BGUI	[BGIX]
Beirut	P8C		
Belgrade	G8T		
Bogota	S3B		
Brasilia	S5F		
Brazzaville	G4B?	BRZV	[BRZX]
Bucharest	A9C		
Budapest	D2Z, D6Z		
Buenos Aires	L9C		
Cairo	O9B	LCRE	
Conakry		CNRY	[CNRX]
Dakar	L4N	DKAR	[DKRX]
Damascus	D4B		
Djibouti		DJBT	[DJBX]
Islamabad	W3S	ILMB, ILMD	[ILMX]
Jeddah	O6F		
Kinshasa	B1P	KHSA	
Kuwait		KWIT	
Lagos	Y4G	LGOS	[LGSX]
Moscow	U3H		
Naimey		NMEY	
Ndjamena		NDJA, NDJM	[NDJX]
Nicosia		NCSE, NCSK	
Nouakchott	Z4D		
MFA Paris	P6Z, RFGW	DIPL	
Prague	F9S		
Pretoria	Y9L		
Rabat	J5W	RBAT	
Riyadh	O6P	RYAD, RYDH	
Tripoli		TRPL	[TRPX]
Tunis	K4X		
Warsaw	H7K	SRZ944	SRZ944

Example 2: Typical Off-line Encrypted Traffic (Embassy N'Djamena)

ryryry ndjx 223 [NDJX = N'Djamena to Paris Circuit]
rr cc
sv dipl [destination is MFA Paris]
tt
de ndja 80 80 133 133 [sender is NDJA = N'Djamena]
tkckk hkkls ndguj bzmtk ozsjk fkyuk fuikl sdlki yfppx ylkek
gthyg qkskx kifik kskp gtkkk zkkgk pklij kacdz attug cxklk
etc etc
nnnn

Glenn Hauser, P.O. Box 1684-MT, Enid, OK 73702
E-mail: wghauser@yahoo.com
Web: www.angelfire.com/ok/worldofradio

Voice of Vietnam Gets Canadian Relay

Ivan Grishin in Ontario, who keeps track of Russian relays, found VOV on new 9695 toward the end of March after the A-00 season began, a couple of seconds off the Russian relay on 7250, with English at 0100. It was irregular during the following week, but soon became clear that Sackville was being used. Bill Westenhaver provided this schedule with powers, azmiuths:

0100-0259	9695	250	268
0300-0359	9795	250	227
0400-0459	9795	250	277

And checking the VOV website, **www.vov.org.vn/docs1/english/programme/index1.html** we found

Russian frequencies had already been deleted, replaced by these without Canada being mentioned, on the language rotation previously used via Russia: 0100 English, 0130-0230 Vietnamese, 0230 English, 0300 Spanish, 0330 English, 0400-0500 Vietnamese. Mark J. Fine said these are in fact a Merlin relay. We then inquired of Merlin, who replied:

Dear Mr Hauser, Thank you for contacting us through our website. The Voice of Vietnam broadcast that you heard was part of a 10 day testing period that we are currently undertaking from a short wave site in Canada. (Merlin Marketing, March 30)

But the relays continued on into April, evidently replacing Russia. Reception has not been as good as one would expect from Sackville, partly due to adjacent-channel problems, but certainly better than via Russia or direct.

The three English broadcasts had the same content, news followed by feature such as *Sunday Show*, about traditional music. No frequencies were mentioned at sign-on. Noticed at 0225 during the Vietnamese broadcast that Viet lessons were being presented in English, something one would expect to find on the English service.

Look It Up, Yourself...

The A-00 HFCC schedule is on the High Frequency Coordinating Committee site. **www.hfcc.org/data/a00/a00allx2.exe** is the URL for the schedule, very long, as it took 180 pages to print the B-99 edition (Jim Moats, OH)

The FCC site has summer schedule data for US private broadcasters at **www.fcc.gov/ib/pnd/neg/hf_web/hfff0z00.txt** (Matt Francis, Australia, *Electronic DX Press*)

And IBB, US government station schedules are a **http://sds.his.com:4000/fmds_z/schedules/freqsked.txt** (Bill Whitacre)

AFGHANISTAN V. of Shariah was checked and heard every morning March 22 through April 2, from a beach vacation site in Kaanapali, Maui, Hawaii, including English with a young female announcer around 1458-1521 and Russian from 1632, corresponding to local dawn enhancement. Reception was occasionally nearly excellent, except for persistent QRM from hams and utes. Monitoring this station stretched my DXing capabilities to the max, with its extreme drift, and the need to constantly flip from USB to LSB for best reception. Frequency varied constantly as low as 7070.64 at first, to 7085.39 at the end of the period. Carrier off around 1647 to 1650* (Walter R. Salmaniw, MD, HI, *DX Listening Digest*)

Radio Voice of Shari'ah is the official Taleban-run broadcaster (formerly Radio Afghanistan). Address: Afghan Radio, PO Box 544, Kabul, Afghanistan. Tel: +93 25241. SW portion of monitored schedule: Sat-Thu 0100-0330 7078v in Pashto/Dari; Fri 0330-0800 7075v [sic] in Pashto/Dari including news 0730. Daily 1230-1600 in Pashto/Dari 7075v including news at 1330, and unconfirmed program in Nuristani daily at 1430-1500. Foreign language service daily at 1500-1700 on 7075v and 1107: 1500 English, 1515 Urdu, 1545 Arabic, 1600 Turkmen, 1615 Uzbek, 1630-1700 Russian (© BBC Monitoring)

ALASKA KNLS, English at 0800, not on scheduled new 11780, but actually on 11765 (Chris Hambly, Australia, *DX Listening Digest*)

AUSTRIA New Austrian right wing government will cut the annual RÖI Vienna external service budget from 166 to 140 MegaSchillings [about 2M US$] (*Salzburger Nachrichten* via Herbert Meixner, Austria, A-DX via Wolfgang Büschel, *DX Listening Digest*) Relay via RCI to WNAm on 17865 shifted an hour earlier to 1500 English, 1530 Spanish (gh)

CHECHNYA [non] R. Chechnya Svobodnaya's new schedule is: 0200-0500 and 1330-2000 on 7335; 0200-1700 on 12045; 0530-1400 on 15620; 1730-2000 on 9940; via St. Petersburg (Jan Nieuwenhuis, *DX Hotline*)

CHINA China Radio International has been self-interfering with their 0400 9730 kHz broadcast to the West Coast with some people in a studio doing auditions and tryouts right on top of the regular broadcast. It doesn't happen on weekends. One Thursday there were 15 repeats of the "People in the know" introduction on top of the hourly news. The more complex the system the more that can go wrong. Bring back Marconi's spark gap. (Daniel Say, BC, *swprograms*)

COLOMBIA Emisora Ideal - HJMK, 2200.18 (2 x 1100 harmonic), 0953 strong carrier, 0959 sign-on with 2 instrumentals, 1003 into HJ anthem and sign-on ID. Fair signal (Mark Mohrmann, VT, *DX Listening Digest*)

CONGO DR Clandestine, Radio Liberté, 15725: I got a note from MLC confirming that they are broadcasting from Gbadolite in the Congo. MLC Tel: (871) 762.280.770 Fax: (871) 762.012.214 Email: MLCongo@compuserve.com Web: **www.mlc-congo.org**

Great Lakes media watchers filled us in on some of the clandestine stations in this region:

Radio Bukavu, 6713, is now controlled by the rebel Rassemblement congolais pour la democracie (RCD)- Goma faction.

Radio Candip, which uses both 3390 and 5066, is controlled by the RCD faction of Ernest Wamba dia Wamba: the Rassemblement congolais pour la democracie - Mouvement de libération (RCD-ML) (Hans Johnson, *Cumbre DX*)

R. Liberté, 15725 quite good but at 1700-1900 there is a big signal from Radio Pakistan on 15725 kHz (a move from 15735?) BTW: Why do all these new clandestines or semi-clandestines here and in Somalia use USB? (Harald Kuhl, Germany, *DX Listening Digest*) The technicians and equipment are more likely from the amateur or commercial fields, where SSB is the standard, not AM (gh)

No ID once music block starts around 2100/2130. Always signs off with an instrumental anthem, very tinny, like an electronic greeting card. The Congolese Liberation Movement website [of sorts] is in French and can be found at **http://members.tripod.com/kunzi/bemba.htm** It features a letter from the group's leader, Jean Pierre Bemba, as well as an email address. The MLC should not be confused with the Congolese Rally for Democracy (RCD), another rebel movement in Congo, which has a web site at **www.congo.co.za** (Hans Johnson, FL, *Cumbre DX*)

COSTA RICA In mid-April, RFPI switched from 6975 to 6970 due to an interference complaint from Portugal, and schedule was reduced to: 0300-0800 6970 (to 1200 on weekends), 1200-0400 25930-USB, 1600-0400 15049 – but always check beyond these hours just in case (gh) RFPI's new US address is P. O. Box 1094, Eugene OR 97440. A new antenna is under construction, quarter-wave length, 155 feet long. (Joe Bernard and James Latham, RFPI *Mailbag*) Hmm, full wave would be 189 metres or 1580 kHz; maybe new frequency range really above 1600 as alluded to before (gh) RFPI is considering moving one or more transmitters to more acreage for long-wire or rhombic antennas, to avoid the wind problem at the current site

All times UTC; All frequencies kHz; * before hr = sign on, * after hr = sign off; // = parallel programming; + = continuing but not monitored; 2 x freq = 2nd harmonic; A-00=midyear season, March 26-October 29, 2000; [non] = Broadcast* to *or* for *the listed country, but not necessarily originating there.

threatening antennas on high towers. Also there is a new law in CR which limits the possibility of more community radio stations in the X-band (James Latham and Joe Bernard, RFPI *Mailbag*)

CYPRUS CyBC External Service in Greek, Fri, Sat, Sun at 2215-2245 is on 6180, 7205, 9760. CyBC is the broadcasting authority of the Greek Cypriot government. This service, for Cypriots in the United Kingdom, is transmitted from Merlin Communications facilities near Limassol. Address: CyBC, Broadcasting House, PO Box 4824, 1397 Nicosia, Cyprus. E-mail: rik@xybc.com.cy Web Site: **www.cybc.com.cy** (© BBC Monitoring)

ECUADOR 4019.93 (tentative), La Voz de Su Amigo - (3 x 1340 harmonic), 0958-1032, Long inspirational talk program, with local references to Esmeraldas. Good strength before 1025 fade (Mark Mohrmann, VT, *DX Listening Digest*) La Voz de Tu Amigo, 4019, at 1002-1135 with Ecuadorian folk music, also greeting Colombian listeners; also from 2315 and at 0030-0130 weak but clear with Boleros (Yimber Gaviria, Colombia, *DX Listening Digest*) 4020, La Voz de Su Amigo, 1020-1050, irregular harmonic but strong signal, heard first in mid-98. *Una Herencia para el Futuro* is the show heard by Mohrmann with inspirational messages. After 1030 into *Su Amigo y la Rockola* with popular Ecuadorian music (Rafael Rodríguez Rodríguez, Bogotá, Colombia, *DX Listening Digest*)

New Frequency! 4800v at 0007-0015, Radio Oriental, Tena, *El Expreso de la Noche* (Ballad music in Spanish) until 0200. Ex-4782 kHz announcing still 4780 (Yimber Gaviria, Colombia, *DX Listening Digest*)

4802.5, Radio Oriental 1027, adblock, announcer with time check and ID. Good strength but drifting wobbly carrier (Mark Mohrmann, VT, *DX Listening Digest*)

GERMANY DW has decided to drop *Mailbag North America* from the schedule, according to hostess Erica Gingerich due to budget cuts and small amount of letters received from here (Jim Moats, OH, *DX Listening Digest*)

GREECE VOG, English news at 0201-0207, then Greek: 7450 has constant RTTY QRM, and a jammer off and on; best on 9420 and 12110 (Bob Thomas, CT, *DX Listening Digest*) Also good here on 15630, but English sometimes missing. IBB schedule showed 17565 relay reduced to two hours at 2000-2200 from Greenville southward; 17705 still 1800-2200 from Delano eastward, but one or both often missing, and no more English found within these (gh)

GUATEMALA The new R. Verdad, 4052.5, Chiquimula, first reported here last month, continued to be heard almost every morning, nominally from 1125, but sometimes late, with fade-out earlier and earlier as solstice approached, and is on air Monday-Friday only. Usual programming: after the national anthem, a talk about its history; listeners abroad sometimes greeted around 1135-1140, banjo theme and *El Tren del Evangelio* with hymns. Exact location announced is hard to catch, but sounds like "Monte Orión, Ministerio de la Gloria" (gh, OK)

Just heard an *outrageous* signal from Radio Verdad on 4052.48 kHz at 1153 tune-in. Right where Glenn said it would be. *Easily* the best signal from 60 to 90 meters. Just turned on the tape when a perfect ID, freq, mb, QTH and time was given (Terry Palmersheim, WA, KC7LDP, *hard-core-dx*) Couldn't resist an attempt to try for this: 4052.487 at 1156 March 21, signal strength measured at -106 dBm (Thomas B. Roach, CA *hard-core-dx*) We never hear it in the evening, but... Radio Verdad, Christian instrumentals after 0000, pulled plug at 0020. Not heard during the weekend (Hans Johnson, FL, *Cumbre DX*) So they do run until approximate local sunset weekdays. I continue to hear it weekday mornings only before 1200 (gh)

GUYANA. GBC reactivated 5950 in mid-March, a blob-mitter at first, but later OK until blocked by WYFR at 0956 (Hans Johnson, FL, *Cumbre DX*)

IRAN [non] Radio Voice of Iran in Farsi is on the air via Kishinov, Moldova, 500 kW, 115 degrees, 1630-1830 on new 12065 (SINPO 55555) but is actually Grigoriopol Merlin Network One (*Observer*, Bulgaria)

ITALY The Santa Palomba Rai site near Rome, megawatt MW 846 kHz, was closed down by authorities April 14 following complaints by local people concerned about excessive RF radiation. Rai was appealing the decision. This may also have affected SW transmitters at the same site (Alfredo E. Cotroneo, President, NEXUS-Int'l Broadcasting Association, Milano, via Hans-Joachim Koch) Shortly before this, 9675 was missing from English to North America at 0050, still on 6010, 11800 (Bob Thomas, CT, *DX Listening Digest*) We have suspected 9675 be a different transmitter site due to muffled audio (gh)

KOREA SOUTH [non] RKI made their regular summer shift to 11715 1030-1100 April 2. Reception weak as usual. Considering the numbers of years this relay [via CANADA] has been in operation, you would think they would do something about the consistently poor reception (Ivan Grishin, Ont., *DX Listening Digest*)

KUWAIT Radio Pinoy can be heard daily on 17885 1000-1200 in English and Tagalog to Filipinos in Kuwait, the Gulf region, southeast Asia and the Philippines. A clip of this service opening can be heard on Interval Signals Archive at **www.intervalsignals.com** Pinoy simply means a Filipino person (masculine) (Dave Kernick, *hard-core-dx*) 17885 is an old Kuwait frequency. His clip opens with ID as "Rahdio Pinoy on Raydio Kuwai" and Kuwaiti anthem. Name R. Pinoy has previously been used by ethnic Filipino outlets on US subcarriers, NY or LA (gh)

MALTA [non] V. of the Mediterranean schedule includes English: Mon-Sat 0600-0630 7150; Sat-Thu 1900-2000 12060; Sun 0800-0900 11770. Sites not shown either, but known to be Italy, Russia (via Hans-Joachim Koch, *DX Listening Digest*) Also 11410 at 2000, spur from Russia 12060 mixing with 11735 (Wolfgang Büschel, Germany, *DX Listening Digest*)

MONGOLIA The only good result of Daylight Shifting Time is that I get up an hour earlier UT and can notice some things I might have missed. For example: Voice of Min-gewl-ya has moved English to Australia to 1030 UT on 12085 kHz, good signal. Announced further English as 1500 to S. Asia and 2000 to Europe, both on 12015//12085. April was one of the best times of year to hear them, with grayline conditions around 1050-1130 UT to eastern NAm (John Cobb, GA, *DX Listening Digest*)

Radio Ulan Bator was heard here in Taranto in the South of Italy, at 1200 in on the harmonic 24170 kHz (12085 x 2) with a fair signal (Antonello Napolitano, *hard-core-dx*) I had been looking for RUB's English broadcast previously at 1200. On 12085 a fluttery signal in Japanese, featuring wonderful Tuvan throat-singing at 1217, later *Estrellita* (gh)

There were strange goings-on during the English transmission of Voice of Mongolia one morning at 1030 on 12085. I tuned in just before 1030, and the English program started as normal with the interval signal IS repeated thrice, then station ID by woman. As she was reading off times/frequencies, suddenly went off. Signal came back a couple minutes later, but it was endlessly repeating oriental music piece with ID by man, "This is Radio Free Asia." This kept going on and on till at least 1050 (Craig Seufert, NH, *DX Listening Digest*) Well, we know that RFA has used Mongolian site for a long time, even though they pretend not to admit it. This mixup confirms it (gh)

PAKISTAN R Pakistan A-00 English at 1600-1615 observed on 11570.11, 15100.21, [not heard 17510-Karachi], 17720.00 (Wolfgang Büschel, Germany, *BC-DX*)

PERÚ R. La Hora: Having just visited Cusco, I would like to convey the regards of Mr. Carlos Gamarra Moscoso to DXers all around the world. Carlos works at Radio La Hora, in charge of verifying reports. He has done this with utmost sense of dedication and responsibility, and has kept a detailed log of all reports received and all verifications sent out. The management of the station had not cared much for reports before Carlos took over the job. If you have sent a report in the past 10 years or so, but have not received a reply, please send a follow-up to Carlos, preferably with a return postage. A reply is guaranteed for all correct reports - he does check them. Carlos has just one wish: please do let him know once you have received the verification. Mail is unreliable, and Carlos is so worried that some of the QSLs sent by him never reach recipients.

Gerente of the station is Edmundo Montesinos G. It wouldn't hurt if you also told him how much you appreciate the efforts of Carlos Gamarra Moscoso. Instead of the station address, Carlos says, however, that reports reach him with more certainty, if sent to his home address: Avenida Garcilaso No. 411, Wanchaq, Cusco. And as he is DXer, I am sure he would enjoy receiving the same kind of radio memorabilia that all we DXers love to collect... During the first week of July Radio La Hora is hoping to inaugurate a new 2-kilowatt shortwave transmitter to replace the present 1-kilowatt (Mika Makelainen, *hard-core-dx*) **http://www.makelainen.com/dx/dxpedit.htm**

Radio Ilucán, 2950.32 at 1009, 2nd harmonic of the nominal 1470 AM outlet, obviously off-frequency. Andean song followed by clear sign-on ID. Weak and // powerful 5678 (Mark Mohrmann, VT, *DX Listening Digest*)

New station Radio La Voz del Campesino, Huarmaca, heard on 6956.6 between 0012 and 0130 with wonderful Andean folk music, a real musical treat, and frequent announcements (Hans-Joachim Koch, Niddatal, Germany, *DX Listening Digest*)

On 6819.6, R. La Voz de las Haurinjas, Huancabamba, Piura at 2246-2330 with pasillo and chicha music; also 1050-1138 and invited phone calls. I talked with the son of the owner and then with Sr. Alfonso García Silva, who told me that the name of the station comes from one of the lakes in the area. Address is: Barrio El Altillo s/n (sin número) in the city of Huancabamba. They generally open at 1045 UT and close at 0200. To phone them, dial 51-74-473259.

Huancabamba is at 3957m above sea level, a province famous for its magical practices and traditional medicine, located in the highlands of Piura, where the best curanderos are found. Their rites habitually involve taking patients to the lakes between the peaks. These are renowned for their medicinal properties, still not studied, attracting numerous curanderos and shamans from all over the country in search of magical visions to help them in their work, income, and/or to recharge their energy. Among the best known lakes are Negra, Blanca, Shimbe, Huarinjas, etc. Mr. García informed me that he is a curandero himself (Pedro F. Arrunátegui, Lima, *Chasqui DX*) 6819.4 replaces 7003.4 (Rafael Rodríguez, Colombia, *DXLD*)

According to the official frequency list of the Ministry of Transports and Communications, issued in September of 1999, "La Voz de las Huarinjas Empresa Individual de Responsabilidad Limitada" is currently licensed under the callsign OAW1B, to transmit on 4930 kHz with 1 kW. Studio and transmiiting site is located at Barrio El Altillo s/n, Huancabamba, Provincia de Huancabamba, Departamento de Piura, Perú (Takayuki Inoue Nozaki, *Relámpago DX*)

Still in the hamband on 7042, March 26 0008-0030*, is J doble C, closing with national anthem at 0029. (Yimber Gaviria, Colombia, *DX Listening Digest*) On 7040.5, Estación J Doble C, 2340-0130, Huancabamba. This frequency used for several years by different radio stations under the direction of César Colunche Bustamante. Previously heard on this channel: Radio San Ignacio and Radio Melodía. Surprisingly at 0017 sent greetings to Takyuki Inoue, Henrik Klemetz. Also mentioned address, Calle Unión No. 612, Huancabamaba, Piura, Perú. Very close to the address of Radio Huancabamba, 6281 kHz, Calle Unión No. 610 that also belonged to César Colunche (Rafael O. Rodríguez R., Santafé de Bogotá, Colombia, *DX Listening Digest*)

Radio Bolívar, Bolívar, 5460.43: I received a phone call from Julio Dávila Echevarría, the station owner and director, thanking all DXers for listening on SW. Sked is 1100-1300 and 2200-0100 daily. Reports will be

confirmed by QSL letter and should be sent to: Correo Central, Bolívar, Provincia de Bolívar, Departamento de La Libertad, Perú. Mail delivery may be via Cajamarca (Takyuki Inoue Nozaki, Japan, *Relámpago DX*)

Radio Satélite, 4780.00, 0213-0231*, Andean vocals, Peruvian anthem and 0231 signoff (Mark Mohrmann, VT, *DX Listening Digest*) Incredible: Peruvian on an exact frequency (gh)

R. Cielo heard at 1028-1145 with several IDs, frequency varying slightly between 4692.0 y 4693.2. Tried to hear them between 0040-0108 but no signal; announcer sounds Peruvian, but no ads, just IDs between songs (Pedro F. Arrunátegui, Perú, *Chasqui DX*)

PHILIPPINES Radio Filipinas is the external service of the Philippine Broadcasting Service, under the control of the Bureau of Broadcast Services. It broadcasts via Voice of America shortwave relay transmitters in the Philippines. Address: Radio Filipinas, Philippine Broadcasting Service, 4th Floor, Media Centre, Visayas Ave, Diliman, Quezon City 1103, Philippines. Complete daily schedule, to the Mideast: 0230-0330 TAGALOG 11885 15120 15270; 1730-1930 ENGLISH 11720 15190 17720 (© BBC Monitoring) See also KUWAIT

POLAND R. Polonia website A-00 English schedule on SW:
1200-1259 11820 9525 7270 6095
1700-1759 7285 6000
1930-2029 9525 7265 7185 6035
Which means as usual in NAm we must rely on WRN or internet to get it; loud and clear on WRN1 daily 2030-2100 and 0300-0330 UT (gh)

PORTUGAL 15580, one of VOA's best frequencies here where it doesn't matter, and I am sure overseas where it does, was marred by strong co-channel from RDPI (gh) 15580 clashing at 2115 (Chris Hambly, Australia) and at 1950 (George Thurman, IL) And 15445 also has clash between VOA and RDPI at 1900 (Hambly) AAMOF, the RDP A-00 sked, via Carlos L. R. de Assunção Gonçalves via Noël Green via Wolfgang Büschel does list both: 15580 is to NAm, 294 degrees, 100 kW "reserved for special transmissions" 1200-2300 M-F; and without that proviso 1200-2000 Sat/Sun, but may be extended to 2300. Judging from the enthusiasm it was ballgame. 15445 is to Eu, 52 degrees, 100 kW, 1600-1900 M-F but may be extended to 2300; and not mentioned on the Sat/Sun portion of the schedule. Clearly, some improved coordination is needed between IBB and a former host country. VOA has long been on both frequencies, currently 15445 1600-1800 from Botswana, 1900-2200 from Morocco; 15580 1800-2200 from Greenville (gh)

ROMANIA Radio Romania International is coming in very well at 2300-2355 on their summer frequency of 11830. This may be the best time to hear Romania, due to the low noise levels at this time & frequency (Ivan Grishin, Ont., *DX Listening Digest*) Tnx to a tip from BBC Monitoring, we find RRI with three continuous audio streams including English now via website **http://www.rri.ro** - much needed with its SW reception so unreliable (gh)

RUSSIA. A00 monitored schedule of the Voice of Tatarstan: 0400-0500 on 11665; 0600-0700 9690; 0800-0900 11925. In Russian on Wed 0800 and Thu 0400 & 0600. All other broadcasts are in Tatar (including Russian news bulletins and weather forecasts on week-days) (Ildus Ibatullin, station QSL manager via Dmitri Mezin, Russia, via Wolfgang Büschel, *DX Listening Digest*)

SOMALIA Observations from Maui, Hawaii, in late March: 7530.02 USB, Radio Hargeisa. Heard as early as 1502, fading out as late as 1802; did not seem to be daily, and frequently covered by a Chinese station. In the clear at 1700; monotonous long songs. Fair signal with mild hum. 7012 USB, tentatively Radio Gaalkacyo. Fair signal with Horn of Africa music and talk as early as 1604; one day briefly in English at 1653; anthem and carrier off at 1659; lots of ham QRM. 6900, tentative Radio Kismaayo. First heard at 1559 either DSB or AM. Very weak audio, but same type of Horn of Africa music. Possibly off at 1730. No other Somali stations were heard during my two week stay in Maui (Walter R. Salmaniw, MD, Maui, *DX Listening Digest*)

SWEDEN. R. Sweden, English to NAm A-00: 1130-1200 (CAm/Carib), 1230-1300 and 1330-1400 18960; at 1230 also on 17900, 21810 to As/Au; 1330 also 17900. 0230-0300 (CAm/Carib) 9495; 0330-0400 (WNAm) 15240 (May-August, then back to 9495) (via Jan Nieuwenhuis, Benelux DX Club)

SWITZERLAND Worldwide Swiss Radio announced on *Capital Letters* that they are going back to their name Swiss Radio International ("jamcanner", *DXLD*)

Management is considering reducing SW output, but not dropping it completely as of now. Waiting to see how digital SW works out. Amount of hours to certain parts of world in certain languages will be reduced in the next 2-4 years, diverting resources into other things such as Internet. Number of hits to site per month is going up by 10 percent, a healthy figure. Throwing more financial and people resources at Internet service, more multi-layered, and redesigned: **http://www.swissinfo.org**

Listeners were confused about "World Radio Switzerland" which was name of European satellite broadcast, and name of half-hour news and current affairs program. So dropping name completely as of March 26, back to good old S R I, and name of program once again *News Net* (Ron Popper on SRI, via Larry Nebron)

SRI say they will be closing Spanish SW in October; will continue to exist only online (Creomar, *radio-escutas*) Another station leaving us orphans; we ask for letters of protest, not that they will do much good (Francisco Rubio, Spain, ADXB, *Noticias DX*)

TAIWAN RTI English hours:

NAm	0200 & 0300	5950 & 9680 via WYFR
	0700	5950 WYFR
CAm	0200	11740 WYFR
Eu	1800	3955 Skelton
	2200	11565 15600 WYFR
Au/NZ	1200	9610
Japan/Korea	0300	11745
	1200	7130
SE Asia	0200 & 0300	15345 11825
	1400	15125

(Bob Thomas, *DX Listening Digest*)

THAILAND Radio Thailand on 9885 (ex 9810) 1230-1300 English (Ivan Grishin, Ont., *DX Listening Digest*)

UKRAINE From 24th March Lviv's 1000 kW transmitter is off the air for indefinite term. The reason is overconsumption of the electricity limit. So, these frequencies are temporarily unavailable: 13590 (from 2300 to 0400), 15530 and 21520 kHz (Alexander Yegorov, via Rachel Baughn) 13590 was the only frequency listed to North America, all in Ukrainian (gh)

UNITED KINGDOM A *World of Radio* Editorial, not necessarily reflecting the views of the US Government: The BBC's new setup is a royal mess. Sackville and Antigua carried different streams much of the time - not necessarily a bad thing, but published programme schedules are virtually useless. Just establish a programme schedule and stick to it. (gh) *BBC On Air* April listings for Australia were totally off with wrong time conversions from GMT (Chris Hambly, Victoria)

BBC is looking for a property partner as part of a review expected to see it moving out of some of its most famous sites, including Bush House, home of the World Service. Greg Dyke, the BBC's director-general, wants to move into larger, more modern premises. The BBC's lease on Bush House expires in 2005, and while it is likely to be renewed, the BBC believes the building needs to be completely redeveloped. The World Service may be moved into a purpose-built headquarters elsewhere. (Neil Bennett, *Electronic Telegraph* via Mike Cooper)

U S A About a hundred VOA European language broadcasters and supporters attended a rally across the street from VOA headquarters on March 23, protesting cuts to VOA European and some Asian language services. VOA's Andrew Baroch recorded interviews and sound at the rally. The 32-minute feature is available in RealAudio format at... **www.voa.gov/savevoa.ram** This is the first *Communications World* Internet-only report (Kim Andrew Elliott, *swprograms*)

Dear Glenn, I am pleased to announce that *Marion's Attic* has moved to a new time slot due to the wishes of my radio fans, Saturday at 9 PM Eastern time !!! Marion has a whole hour now to play more of the sounds of very, very long ago. I am told that there isn't a show like mine anywhere on the radio. I only wish to make listeners happy and perhaps teach a little history of recorded sound. This time slot will allow me to reach more people with better propagation. (Marion Webster, MarionWeb@aol.com) That's UT Sundays 0100-0200 on WBCQ, 7415 (gh)

World of Radio changes on WBCQ: Wed 2330 on 7415, Fri 2030 on 9330-CUSB; on WWCR, Sun 2330 on 9475.

Major WRMI changes include: A new program called *Worldbeat USA*. Host Tony Bourne is from Trinidad (but now lives in the Miami area), and he plays hit music from the Caribbean, North America and Latin America. This airs UT Tue-Sat 0030-0100 on 7385 to NAm and Sat 2000-2200, Sun 1500-1600 on 9955 to Caribbean and Latin America.

A new airing of AWR's DX program *Wavescan* UT Thursday at 0330-0400 on 7385 kHz to North America [actually two minutes early and four weeks late -gh]. Another new music program called *This Lousy Half-Hour Radio Show* with Charlie Kaufman playing a wide variety of music, especially oldies from the 1960's, UT Sun 0330-0400 on 7385 just prior to the popular music program *Scream of the Butterfly* (Jeff White, WRMI)

[non] World Beacon, African Service, Jacksonville, FL, started April 3 via Rampisham, UK and Meyerton, South Africa. Specializes in American black ministries who want to reach Africa:
0430-0630 6115 Southern Africa [delayed start till May]
1600-1800 6145 Southern Africa
1800-2200 9675 North, Central & Southern Africa [Rampisham]
(Merlin via Dave Kenny, British DX Club)

You can hear a clip of the African Beacon IS on the Interval Signals Archive at: **www.intervalsignals.com** (Dave Kernick, *hard-core-dx*) Actual ID is "World Beacon, African service" website as **www.worldbeacon.net** (gh) Also was about to start Australian service (Chris Hambly, Victoria)

VATICAN CITY Vatican Radio has a weekly (UT Sunday) eastern rite Catholic mass in Ukrainian. Very beautiful service, sung, no instruments, as is the custom in the eastern church. Good reception at 0701 on 11740 parallel to 9770 fair. This is the summer schedule (Walt Salmaniw, Maui, *DX Listening Digest*)

VENEZEULA R. Continental, Barinas, according to owner Sr. Ángel María Pérez, plans to reactivate SW with 1 kW. They are interested in broadcasting educational programs such as Fun With Mathematics (*Matemática Divertida*) and religious programs for the entire state of Barinas (Jorge García Rangel, *Banda Tropical)* Was once on 4940, now occupied by another Venezuelan, R. Amazonas (gh)

YEMEN Sana is now drifting on the high side of 9780. In the past, I always heard them on 9779.79. Interval signal and national anthem at 1759 [then English as sked? -gh] on 9780.28. Two days later on 9781.80 (Walt Salmaniw, Maui, *World of Radio*)

YUGOSERBIA R. Yugoslavia's sked starting April 2 includes English to NAm on 9580, 0000-0030 except Sun, and 0430-0500 daily, 310 and 325 degrees respectively, 250 kW (Andreas Volk, ADDX via Büschel and Padula) But last summer they went up to 11850 (gh)

Until the Next, Best of DX and 73 de Glenn!

Broadcast Logs

GLOBAL FORUM

Gayle Van Horn

0057 UTC on 9675
ITALY: RAI. News item on Italy's peace-keeping forces in East Timor plan to return home to Italy. (Bob Fraser, Cohasset, MA) Audible 2214-2225*, audible English service IDs. (Harold Frodge, Midland, MI) // 11800, 0050 with IDs, freq quote and report on Bill Gates. (William McGuire, Cheverly, MD)

0058 UTC on 6025
DOMINICAN REP.: Radio Amanecer. Spanish. Religious program to "un programa de cresimieto spiritual para catolicos..", SIO=222. (Daniele Canonica, Muggio, Switzerland)

0100 UTC on 5930
SLOVAKIA: Radio Slovakia Intl. English service with WWCR dominate on 5930; // 9440, 7300 good to fair signal quality. (Lee Silvi, Mentor, OH)

0200 UTC on 7210
BELARUS: Radio Belarus. Interval signal to ID/freq quote and evening newscast. (Ronald Schwartz, Trondheim, Norway)

0205 UTC on 6005
GERMANY: Deutschland Radio. German. News to station IDs and jazz music program, featuring saxophone great Ben Webster. (Schwartz, NOR; Tom Banks, Dallas, TX)

0230 UTC on 7325
AUSTRIA: Radio Austria Intl. Sign on interval signal to ID and national report. (McGuire, MD) News and *Report From Austria* magazine show 1600 on 17865. (Ben Loveless, MI)

0319 UTC on 4960
SAO TOME: Voice of America relay. "*VOA Africa*" show with report on Nigeria. *Daybreak Africa Sports Report* to sign-off ID at 0330. (Frodge, MI) **VOA Kavala**, **Greece** relay 0200, 11820; **VOA Wofferton, U.K**. relay 0400, 7170. (McGuire, MD) Audible 1848, 4960 in French service. (Zacharias Liangas, Thessaloniki, Greece/ *Hard Core DX*)

0346 UTC on 6010
MEXICO: Radio Mil. Spanish service with DX program featuring several SWBC anthems and interval signals. "RM" identification at 0400. Covered at the hour by Voice of Turkey's *0400. (Frodge, MI) Mexico's **Radio Huayacocotla** heard 2390, 2340 with Mexican music at tune-in. Local announcements to station ID, choral national anthem to 0056*. (Banks, TX)

0400 UTC on 6010
TURKEY: Voice of. Interval signal 0355 with English ID before sign-on. Frequency quote to news and commentary, covered by Mexico's **Radio Mil**, fair signal, best in lower side band. (Frodge, MI)

1045 UTC on 9650
CANADA: Radio Korea relay. *Cultural Promenade* feature on filming the ancient Korean opera *Chim Yun*. **Radio Japan**'s Canadian relay 6120, 1105 with item on Aum Shirinko cult still under investigation. (Fraser, MA)

1030 UTC on 3220
ECUADOR: HCJB. Spanish. Station IDs to Andean vocals program. (Banks, TX) *Unshackled* series in English, audible 17660, 2000. Audible 1935 at 17660 (Fraser, MA)

1050 UTC on 9580
AUSTRALIA: Radio Australia. *Law Report* program, focus on children's rights and protections. (Fraser, MA)

1130 UTC on 9650
CANADA: Radio Korea Intl Sackville relay. News and national commentary to traditional Korean music. (Loveless, MI) **RCI** 5960, 2315 *The World at Six* 5960 focus on disappearing Inuit eskimo culture. (Fraser, MA; Banks, TX)

1200 UTC on 9760
PHILIPPINES: Voice of America relay. *VOA News Now* program, with fair signal quality. (Loveless, MI)

1245 UTC on 21810
SWEDEN: Radio Sweden. Report on the concerns of dog-wolf hybrids // 18960. (Fraser, MA)

1300 UTC on 9570
CHINA: China Radio Intl. National and world news to report on Saudi Arabia. (McGuire) Audible 1311-1315+ with CRI IDs, news and interference from Radio Marti. (Frodge, MI) China's Xinjiang PBS 5060.39 (10 kW) in local language to Chinese song, final announcement at 1648*. (Serra, Italy) **Yunnan PBS** 6937 at 2335 in local languages. Music program to lady announcer. (Liangas, GRC/*HCDX*)

1442 on 15140
OMAN: Radio Oman. English/Arabic program interviews. Pop songs to announcement and station identification. Arabic programming 1500 with interferences on frequency. Best to monitor in lower sideband. (Giovanni Serra, Rome, Italy)

1445 UTC on 5985.85
MYANMAR: Radio Myanmar. Lady announcer's English newscast and government politics update. Station identification, very nice to listen once again with better signal! (Zacharias Liangas, Retziki, Greece, *HCDX*)

1555 UTC on 4950
CHINA: Voice of Pujiang. Tentative ID for station, traditional Asian music under **All India Radio**'s 1600 English newscast. Fair quality signal. (Liangas, GRC/*HCDX*)

1748 UTC on 9820
RUSSIA: Voice of. Features of Scandinavian language service with travelogue segment. Severe static with fading to IDs 1748 and 1754. (Schwartz, NOR)

1830 UTC on 17695
GERMANY: Radio Vlaanderan relay. English service with features to Africa. Germany's **Deutsche Welle**'s German service 9545, 1915-2110. (Silvi, OH) Deutsche Welle's **Sackville relay** 0300, 9535. (McGuire)

1930 UTC on 9410
UNITED KINGDOM: BBC WS. *Seeing Stars* focus on the Galileo Probe studies Jupiter's moons. **BBC WS Antigua**'s relay 17840, 1530 with *Composer of the Month* program, featuring Johannes Brahms. (Fraser, MA)

2015 UTC on 9895
NETHERLANDS: Radio Netherlands. *Dutch Horizons* feature on pre-school education in the Netherlands. (Fraser, MA) **Madagascar** relay to Africa noted 12090, 1440-1620 fade out. (Silvi, OH)

2108 UTC on 5940
RUSSIA: Voice of . News item on the *Third Russian Festival* of Arts to be held. (Fraser, MA)

2119 UTC on 11775
ANGUILLA: Caribbean Beacon. Dr. Gene Scott waxing philosophical about the discovery of America, evolution, and date of the flood. The dude IS entertaining! (Frodge, MI) – *Harold, you should see how entertaining he is on TV! - ed.*

2124 UTC on 15820
ARGENTINA: Radio Continental. Spanish news monitored in lower sideband. ID as, "Radio Continental, la radio mas potente de Argentina..", SIO=354. (Canonica, SUI)

2127 UTC on 9750
ALBANIA: Radio Tirana. Albanian. Interval signal to sign-on. ID and program line-up to newscast. (Silvi, OH)

2218 UTC on 6895
ISRAEL: Galei Zahal (tentative) Mainly rap/hip hop to disco tunes. Announcer rarely talked except for occasional music titles. Fanfare 2300 into news script and more hip hop. No discernable ID for weak interference ridden signal. **Kol Israel** 2106-2110+ pop music to phone interviews, SIO=454. (Frodge, MI)

2233 UTC on 4770
NIGERIA: Radio Nigeria. Program commentary to easy-listening and pop music. Drum signal to ID at 2259, brief choral anthem to 2301*. (Frodge, MI)

2300 UTC on 11940
ROMANIA: Radio Romania Intl. Evening features monitored to 2355 with // 9570. (Silvi, OH) Summer sked quote to political editorial. (McGuire, MD)

2342 UTC on 7125
GUINEA: RTV Guinienne. French. Lite Afro and Caribbean format music to lengthy commentary. ID at 2359, national anthem to 0000*. Lower side band monitoring helped due to **Radio Netherland's** *2357 interval signal. (Frodge, MI)

Thanks to our contributors — Have you sent in YOUR logs?
Send to ***Gayle Van Horn,*** *c/o Monitoring Times (or e-mail gayle@webworkz.com)*
English broadcast unless otherwise noted.

Gayle Van Horn, gayle@webworkz.com

Don't Sweat it... Get Creative!

As the future of QSLing continues to change, what are your thoughts on email verifications? Personally, I remain loyal to my station letters and cards delivered by a postal clerk...throw in a pennant or sticker and I've been known to gloat shamelessly!

Times are changing, however. Mediumwave and utility stations have joined the increasing popularity of broadcast stations' quick reply with the click of a mouse. Perhaps you do save on postage, but the daily anticipation (or disappointment) is lost. I shudder to think the days of the "goodie packet" – an oversized enveloped stuffed with enough souvenirs to make fellow hobbyists green with envy – may be lost in the shuffle.

Having said that, email verifications will continue to gain popularity among the broadcasters, so why not consider an extra step to improve that drab reply letter? After all, it still is a QSL.

Cut and paste the unwanted junk from your email, or add a graphic, and get rid of that stale white paper! Printer paper in extreme or pastel colors and designer papers greatly improve the appearance of the verification. Both will print on any ink jet, laser printer or copier. With an eye to archiving your verifications, consider acid- and lignin-free paper. My two favorites are *Geopaper Geo Scroll* by Geopapers, and *Certificate of Achievement PC Papers* by Ampad, both available through office supply or chain outlets.

The opportunities to create and customize are as endless as your imagination. When finished, that once plain reply is now a personalized design. Get used to it...email verifications likely are the wave of the future, so go get creative.

In case you prefer QSLing via reports with International Reply Coupon enclosures, here is an extra tip from Larry Van Horn N5FPW and Ken Holdom ZL2HU-QSL Manager. Due to the cancellation of an order for a considerable number of IRCs, the Kermadec DX Association has available a number of IRCs at ninety cents each U.S. funds, in bundles of 20. Kermadec pays the return postage; however, they would appreciate a return address label.

Payment is $18 per bundle, U.S. cash or check drawn on a U.S. bank (payable to Kermadec DX Association) preferred. All proceeds go toward their next DXpedition to ZK3 (Tokelaus Island) in 2002. Send your order to: P.O. Box 56099, Tawa, Wellington, New Zealand.

Thanks Larry and Ken! Have you sent us your tip for future DXpeditions or QSLing?

CHAD

Radiodiffusion Nationale Tchadienne, 4904.5 kHz. Full data QSL card signed with illegible signature. Received in 311 days for a French report. Station address: Boite Postal 892, N'djamena, Chad. (Enzio Gehrig, Spain/*Hard Core DX*) Nice catch. This sought-after QSL tends to respond slowly, but worth the wait! *-ed.*

CHINA

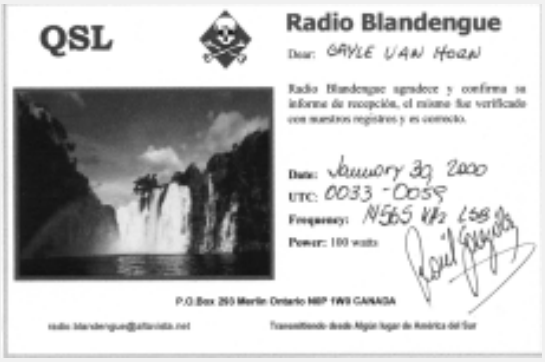
China Radio International, 9690 kHz. Full data QSL card, plus stickers and calender. Received in 44 days for English report and one IRC. Station address: Jia 16, Shiijingshau Lu, Shijingshan Qu, Beijing, China 100039. (Anthony Maslanka, Cleveland, OH)

PERU

Radio Ilucan, 5678 kHz. Full data verification on station letterhead, signed by Jose Galvez-Gerente, plus a photocopy of my report enclosed. Received for a Spanish report. Station address: Jiron Lima No 290, Cutervo, Region Nororiental del Maranon, Peru. (Daniele Canonica, Muggio, Switzerland)

PIRATE/SOUTH AMERICA

Radio Blandegue, 14565 kHz LSB. Full data color waterfall scene card signed by Raul Gonzales, plus station newsletter, four stickers and personal letter from veri signer. Received in 47 days for report of special broadcast. Included Spanish report, two IRCs, self-addressed envelope, prepared Spanish QSL card (both returned) and souvenir postcards. Personal letter states station is 100 watts with a V inverted antenna. Station address: Box 293, Merlin, Ontario N09 1W0 Canada. (Gayle Van Horn, Brasstown, NC)



Emisora Z del Dragon, 14565 LSB. Full data color Dragon QSL card signed by Fede, plus English personal reply from veri signer's son on station letterhead, and two station stickers. Received in 45 days for report of special broadcast. Included Spanish report, two IRCs, self-addressed envelope, prepared Spanish QSL card (both returned) and souvenir postcards. Station address: Casilla 159, Santiago, Chile. Personal letter states the station operator is Fede and that "I am a kid of 11 and my father is Raul Gonzalez and all my activities are supervised for him." (Van Horn, NC)

SOUTH KOREA

Radio Korea International. Full data QSL card unsigned, plus station sticker, newsletter and schedule. Received in 29 days for an English report and one IRC. Station address: 18 Yo-ui-do-dong, Yongdungp'o-gu, Seoul, South Korea 150-790. (Maslanka, OH)

SPAIN

Radio Exterior De Espana 6055 kHz. Full data Spanish letter and schedule. Received in 38 days for an English report and one IRC. Station address: Apartado 156.202, 28080 Madrid, Spain. (Maslanka, OH)

UNITED KINGDOM

GKB-Portishead Radio, 12835.4 kHz. Full data QSL card plus brochure on the history of the station. Received in 22 days for one U.S. dollar. Station address: BT Radio Station, Highbridge, Somerset, TA9 3JY England. (George Clement, Powder Springs, GA) Portishead Radio recently ended 80 years of being one of the largest communications centers in the world. Your QSL is definitely one to keep for nostalgia *...ed.*

World Beacon 9675 kHz via Rampisham. Email verification received in 20 minutes from Scott Westerman-President. Address: **<reception@worldbeacon.net>**. Letter states QSL cards are at the printer and will be sent as soon as available, and included details about the station. (Richard Jary-Australia/ *Hard Core DX*) World Beacon, a Christian evangelical service to Africa, began broadcasting in April 2000.Transmission facilities are provided by Merlin Communications. Meyerton, South Africa transmissions are 1600-1800 on 6145; Rampisham, England 1800-2200 on 9675 kHz. U.S. address: 2251 St Johns Bluff Rd., Jacksonville, FL 32246. South Africa address: P.O. Box 651525, Benmore 2010, South Africa. Additional email: **<info@worldbeacon.net>** Station website: **<www.worldbeacon.net>** *-ed.*

GROVE GOVERNMENT SPECIAL

WiNRADiO 3150DSP

Looking for a computer-hosted, wideband receiver with better specs for signal surveillance? For starters, how about continuous 150 kHz-1500 MHz reception, 65 dB image and spurious signal rejection, and 85 dB dynamic range? This is the WiNRADiO WR-3150i-DSP, designed specifically for government, military, and law enforcement applications.

Featuring AM/SSB/NFM/WFM demodulation, 10 Hz tuning steps, and selectable bandwidths (2.4, 9, 17, 270 kHz), this plug-in receiver ISA card can memorize thousands of channels and scan them at speeds up to 50 per second! It will even log intercepts unattended, storing them into virtually unlimited memory for later recall! Up to eight independent receivers can be controlled at one time.

The Visitune spectrum display spans up to 100 MHz at a time, with storage and recall of multiple scans. And you can access any signal immediately by pointing and clicking your mouse, or even rapidly tune through the spectrum by simply dragging the mouse. Double-clicking on a spike provides accurate center-frequency readout of AM and FM signals.

Built-in DSP permits audio recording, playback, and many other specific applications. A task manager permits programmable operation and response. A DSP developer's kit and technical support are available for custom requirements.

For Government sale only

WBR31-EG - WiNRADiO 3150 External: $1849.95

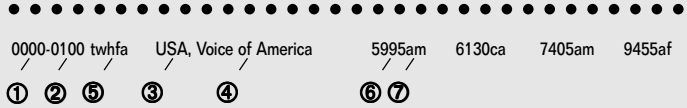
WBR31-IG - WiNRADiO 3150 Internal: $1849.95

Consumer versions available, less cellular:
WBR31-i - WiNRADiO 3150 Internal: $1849.95
WBR31-e - WiNRADiO 3150 External: $1849.95

GROVE
WWW.GROVE-ENT.COM

Grove Enterprises, Inc.
800-438-8155
7540 Highway 64 West
Brasstown, NC 28902
828-837-9200 828-837-2216 (fax)
order@grove-ent.com

How to Use the Shortwave Guide



Convert your time to UTC.

Broadcast time on ①and time off ②are expressed in Coordinated Universal Time (UTC) – the time at the 0 meridian near Greenwich, England. To translate your local time into UTC, first convert your local time to 24-hour format, then add (during Daylight Savings Time) 4, 5, 6 or 7 hours for Eastern, Central, Mountain or Pacific Times, respectively. Eastern, Central, and Pacific Times are already converted to UTC for you at the top of each page.

Note that all *dates*, as well as times, are in UTC; for example, a show which might air at 0030 UTC *Sunday* will be heard on *Saturday* evening in America (in other words, 8:30 pm Eastern, 7:30 pm Central, etc.).

Find the station you want to hear.

Look at the page which corresponds to the time you will be listening. On the top half of the page English broadcasts are listed by UTC time on ①, then alphabetically by country ③ followed by the station name ④(If the station name is the same as the country, we don't repeat it, e.g., "Vanuatu, Radio" [Vanuatu].)

If a broadcast is not *daily*, the days of broadcast ⑤will appear in the column following the time of broadcast, using the following codes:

Day Codes

s	Sunday
m	Monday
t	Tuesday
w	Wednesday
h	Thursday
f	Friday
a	Saturday

In the same column ⑤irregular broadcasts are indicated "tent" and programming which includes languages besides English are coded "vl" (various languages).

Choose the most promising frequencies for the time, location and conditions.

The frequencies ⑥follow to the right of the station listing; all frequencies are listed in kilohertz (kHz). Not all listed stations will be heard from your location and virtually none of them will be heard all the time on all frequencies.

Shortwave broadcast stations change some of their frequencies at least twice a year, in April and October, to adapt to seasonal conditions. But they can also change in response to short-term conditions, interference, equipment problems, etc. Our frequency manager coordinates published station schedules with confirmations and reports from her monitoring team and *MT* readers to make the Shortwave Guide up-to-date as of one week before publication.

To help you find the most promising signal for your location, immediately following each frequency we've included information on the target area ⑦of the broadcast. Signals beamed toward your area will generally be easier to hear than those beamed elsewhere, even though the latter will often still be audible.

Target Areas

af:	Africa
al:	alternate frequency (occasional use only)
am:	The Americas
as:	Asia
au:	Australia
ca:	Central America
do:	domestic broadcast
eu:	Europe
me:	Middle East
na:	North America
om:	omnidirectional
pa:	Pacific
sa:	South America
va:	various

Consult the propagation charts.

To further help you find a strong signal, we've included a chart on page 64 which takes into account conditions affecting the audibility of shortwave broadcasts. Simply pick out the section of the chart for the region in which you live and find the line for the region in which the station you want to hear is located. The chart indicates the optimum frequencies (in megahertz-MHz) for a given time in UTC. (Users outside North America can use the same procedure in reverse to find best reception from North America.)

Choose a program or station you want to hear.

Some selected programs appear on the lower half of the page for prime listening hours – space does not permit 24-hour listings. Our program manager changes the stations and programming featured each month to reflect the variety available on shortwave, though BBC programs are almost always included.

Occasionally program listings will be followed by "See X 0000." This information indicates that the program is a rerun, and refers to a previous summary of the program's content. The capital letter stands for a day of the week, using the same day codes as in the frequency listing (see above), and the four digits represent a time in UTC.

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Program Highlights

Jim Frimmel, Programming manager

Radio Sweden's summer program guide contains an interesting item about the opening of the Fixed Link. No, it's not about radio communications, it's about commuting. On July 1st the Oresund Fixed Link, a combined bridge-tunnel project, will link together Copenhagen, Denmark and Malmo, Sweden. It will take just 35 minutes to make the trip across the sound separating the two countries by train or car. This is one of Scandinavia's most vital and innovative regions with about 3.5 million people on either side of the water.

Radio Finland's summer shortwave schedule introduces a new English program philosophy. There are now three one-hour programs on the weekend: 0000 Su to NAm, 0800 Sa to Eu, and 2300 UTC Sa to As. Daily quarter-hour news broadcasts fill the gaps at 0100 to NAm, 0630 to Eu/As, and 1930 to Eu.

The good folks at **VOA** came up with a good idea for their summer schedule. The *Talk to America* program, heard only weekdays at 1700 UTC, was not available to many listeners due to work schedules and other commitments. *The Best of Talk to America* can now be heard Saturdays and Sundays at 0233, 0633, 1033, 1433, 1833, and 2233 UTC. VOA has over 100 of these programs in their archives, so the listening should be good.

Deutsche Welle printed a new style program schedule for the summer 2000 season. This is a 30-page, 4x8-inch document containing shortwave frequencies and program information, satellites, rebroadcasting via partner-stations, and DW-tv schedule. You can order the brochure from Deutsche Welle Audience Correspondence, 50588 Cologne, Germany or by e-mail to info@dwelle.de. This appears to be a replacement for the discontinued *DW Plus* monthly program guide.

Radio Budapest's program guide for Apr-May-Jun arrived Apr 19th. The program guide, which used to be extremely complicated and difficult to project for publication in *Monitoring Times* has been significantly streamlined. This 16-page booklet contains interesting glimpses of life in Hungary in their narrative pages, a seasonal recipe suggestion, and letters from listeners. You can get it by writing to Radio Budapest, H-1800 Brody Sandor U. 5-7, Hungary, or send e-mail to ANGOL1@kaf.radio.hu. (Now if they can only get the funds to send via first class mail.)

Our selected programs in the centerfold pages of this issue present the entire shortwave output of **BBC** during the hours of 2300-0700 and 1100-1700 UTC. As we reported last month, BBC switched from three streams of programming to seven in April. But in our computer examination of this output we discovered that alternative programs to the Caribbean have not been discontinued. These "mini-streams" are detailed at 1100 and 1200 UTC. Another broadcast is the *Caribbean Report* that can be heard at 2115. Now whatever happened to the Falklands?

Frequencies

0000	0100		Anguilla, Caribbean Beacon	6090am			
0000	0100	vl	Australia, ABC/Alice Springs	4835do			
0000	0100	vl	Australia, ABC/Katherine	5025do			
0000	0100	vl	Australia, ABC/Tennant Creek	4910do			
0000	0100		Australia, Radio	9660pa	12080va	15240pa	17580pa
				17750as	17795va	21740va	
0000	0015		Cambodia, National Radio Of	11940as			
0000	0100		Canada, CBC Northern Service	9625do			
0000	0100		Canada, CFRX Toronto ON	6070do			
0000	0100		Canada, CFVP Calgary AB	6030do			
0000	0100		Canada, CHNX Halifax NS	6130do			
0000	0100		Canada, CHNX Halifax NS	6160do			
0000	0100		Canada, CKZU Vancouver BC	6160do			
0000	0100		Costa Rica, R for Peace Intl	6970va	15049va	25930al	
0000	0100		Costa Rica, University Network	5030am	6150va	7375na	9725na
				11870va	13749af		
0000	0027		Czech Rep, Radio Prague Intl	11615na	13580na		
0000	0100		Ecuador, HCJB	9745na	15115na	21455va	
0000	0030		Egypt, Radio Cairo	9900am			
0000	0100	s	Finland, YLE/R Finland	11985na	13770na		
0000	0100		Guyana, Voice of	3289do	5949do		
0000	0045		India, All India Radio	7410as	9705as	9950as	11620as
				13625as			
0000	0015		Japan, Radio	6050eu	6145eu	6155af	13650as
				17810as			
0000	0100		Kenya, Kenya BC Corp	4885do	4915do	4935do	
0000	0100		Kiribati, Radio	9809do	9825do		
0000	0100		Malaysia, Radio	7295do			
0000	0100		Malaysia, RTM Kota Kinabalu	5980do			
0000	0100		Malaysia, RTM Sarawak	7160do			
0000	0100	vl	Namibia, Namibian BC Corp	3270af	3289af		
0000	0100		Netherlands, Radio	6165na	9845na		
0000	0100		New Zealand, R New Zealand Int	17675va			
0000	0100		New Zealand, ZLXA	3935do	7290do		
0000	0056		North Korea, R Pyongyang	4405va	11460na	11710na	13760na
				15180na			
0000	0100	vl	Papua New Guinea, NBC	9675do	11880do		
0000	0030	mtwhfa	Serbia, Radio Yugoslavia	9580na			
0000	0100		Singapore R Corp of Singapore	6150do			
0000	0100	vl/as	Solomon Islands, SIBC	5020do			
0000	0100	vl/a	Solomon Islands, SIBC	9545do			
0000	0100		Spain, R Exterior Espana	6055na			
0000	0030		Thailand, Radio	9655af	9690af	11905af	
0000	0030		UK, BBC World Service	3915as	5965as	5975na	6175na
				6195as	7110as	9410me	9590am
				9915sa	11945as	11955as	12095sa
				15280as	15310as	15360as	17615as
				17790as			
0000	0100	as	UK, Global Kitchen/Merlin	3955eu	6140eu	7325eu	
0000	0100		Ukraine, R Ukraine International	5905eu	6020eu	9640eu	
0000	0100		USA, Armed Forces Network	4278am	6458am	12689am	
0000	0100		USA, KAIJ Dallas TX	13815va			
0000	0100		USA, KTBN Salt Lake City UT	15590na			
0000	0100		USA, KWHR Naalehu HI	17510as			
0000	0030		USA, Voice of America	7215as	9770as	11760as	
				15185as	15290as	17735as	
				17820as			
0000	0100	twhfa	USA, Voice of America	5995am	6130ca	7405am	
				9455af	9775am	11695ca	
				13740am			
0000	0100		USA, WBCQ Monticello ME	7415na	9330na		
0000	0100		USA, WEWN Birmingham AL	5825va	13615na		
0000	0100		USA, WGTG McCaysville GA	5085va	6890am		
0000	0100		USA, WHRA Greenbush ME	7580na			
0000	0100		USA, WHRI Noblesville IN	5745na	7315sa		
0000	0100		USA, WINB Red Lion PA	12160am			
0000	0100		USA, WJCR Upton KY	7490va	13594as		
0000	0030		USA, WRMI Miami FL	9955am			
0000	0100		USA, WRNO New Orleans LA	7355na			
0000	0100		USA, WSHB Cypress Crk SC	9430na	15285am		
0000	0100		USA, WTJC Newport NC	9370na			
0000	0100	as	USA, WWBS Macon GA	11915eu			
0000	0100		USA, WWCR Nashville TN	5070na	7435na	9475na	
				13845na			
0000	0100		USA, WYFR Okeechobee FL	6085na	9505na		
0000	0100	vl	Vanuatu, Radio	3945do	4960do	7260do	
0015	0100		Japan, Radio	6050eu	6145na	6155eu	
0030	0100		Iran, VOIRI	9022am	9835ca	11970na	
0030	0100		Lithuania, Radio Vilnius	9855na			
0030	0100		Sri Lanka, Sri Lanka BC Corp	4940do			
0030	0100		Sri Lanka, Sri Lanka BC Corp	4940do	6005as	6075as	
				9730as	15425as		
0030	0100		Thailand, Radio	9655na	11905as	15395na	
0030	0100		UK, BBC World Service	5965as	5975na	6175na	
				6175na	6195as	9410me	
				9590am	9915sa	11955as	
				12095sa	15280as	15310as	
				15360as	17790as		
0030	0100		USA, VOA Special English	7215as	9770as	11760as	
				15185as	15290as	17735pa	
				17820as			
0030	0100	twhfa	USA, WRMI Miami FL	7385na			
0030	0100	sm	USA, WRMI Miami FL	3955am			
0050	0100		Itay, RAI International	6010na	9675na	11800na	
0050	0100		UK, International BC Tamil	11570as			

Selected Programs

Sundays

0000 UK, BBC London (am): News Briefing. A news program of varying lengths.
0000 UK, BBC London (east as): World Briefing. Half-hour of news in depth.
0000 UK, BBC London (south as): News Briefing. See S 0000.
0020 UK, BBC London (am/east as/south as): Sports Roundup. The latest sports news.
0030 UK, BBC London (am): Arts in Action. New program.
0030 UK, BBC London (east as/south as): Agenda. Chris Gunness examines the latest ideas and trends.

Mondays

0000 UK, BBC London (am/south as): News Briefing. See S 0000.
0000 UK, BBC London (east as): World Briefing. See S 0000.
0020 UK, BBC London (am/east as/south as): Sports Roundup. See S 0020.
0030 UK, BBC London (am/south as): The World Today. See S 0100.
0030 UK, BBC London (east as): World Business Review. A look back at the previous week's business and a preview of upcoming events.
0045 UK, BBC London (east as): Letter from America. See S 0145.

Tuesday-Saturday

0000 UK, BBC London (am): News. See S 1200.
0000 UK, BBC London (east as): World Briefing. See S 0000.
0000 UK, BBC London (south as): News Briefing. See S 0000.
0020 UK, BBC London (east as/south as): Sports Roundup. See S 0020.
0030 UK, BBC London (east as): World Business Report. See S 0630.

Tuesdays

0005 UK, BBC London (am): Meridian Ideas. See M 0205.
0030 UK, BBC London (am): The Music Mix. See M 0230.
0030 UK, BBC London (south as): The World Today. See S 0100.
0045 UK, BBC London (east as): Analysis. See M 0645.

Wednesdays

0005 UK, BBC London (am): Meridian Screen. See T 0205.
0030 UK, BBC London (am): The UK Top Twenty. See T 0230.
0030 UK, BBC London (south as): The World Today. See S 0100.
0045 UK, BBC London (east as): Analysis. See M 0645.

Thursdays

0005 UK, BBC London (am): Meridian Music. See W 0205.
0030 UK, BBC London (am): The UK Album Chart. See W 0245.
0030 UK, BBC London (south as): The World Today. See S 0100.
0045 UK, BBC London (east as): From Our Own Correspondent. See S 0230.

Fridays

0005 UK, BBC London (am): Meridian Writing. See H 0205.
0030 UK, BBC London (am): World Music. See H 1430.
0030 UK, BBC London (south as): The World Today. See S 0100.
0045 UK, BBC London (east as): Analysis. See M 0645.

Saturdays

0005 UK, BBC London (am): Meridian Masterpiece. See M 0505.
0030 UK, BBC London (am): Music X-Press. See F 0230.
0030 UK, BBC London (south as): Science in Action. See S 0330.
0045 UK, BBC London (east as): Analysis. See M 0645.

Hauser's Highlights

FRANCE: Radio France Internationale
116 avenue du Président Kennedy, BP 9516, F-75016 Paris, France; *english.service@rfi.fr* Web; **http://www.rfi.fr** - multilingual live audio on demand 24 hours.
English on SW daily:

1200-1300	EuAf	11670 15155 15195 15540
1400-1500	MEAs	11610 17620 17680
1600-1700	Af	11995 12015 15210 17605
1700-1730	Af	15210

(© BBC Monitoring)
In addition, via WRN1 to North America daily at 1500-1600, i.e. just before *World of Radio* on Saturdays (gh)

Hauser's Highlights

INDIA: All India Radio
GOS in English:

2245-0045	7410 9705 9950 11620 13625
1000-1100	1053 11585 13700 15020 17485 17840 17895
1330-1500	9710 11620 13710
1745-1945	7410 9950 11620 11935 13750 15075 15200
2045-2230	7150 7410 9650 9910 9950 11715

(via Alok Das Gupta, via Wolfgang Büschel, *DX Listening Digest*)

Frequencies

0100	0200		Anguilla, Caribbean Beacon	6090am			
0100	0200	vl	Australia, ABC/Katherine	5025do			
0100	0200	vl	Australia, ABC/Tennant Creek	4910do			
0100	0200		Australia, Radio	9660pa	12080va	15240pa	15415as
				17580pa	17750as	17795va	21725pa
0100	0200		Canada, CBC Northern Service	9625do			
0100	0200		Canada, CFRX Toronto ON	6070do			
0100	0200		Canada, CFVP Calgary AB	6030do			
0100	0200		Canada, CHNX Halifax NS	6130do			
0100	0200		Canada, CKZN St John's NF	6160do			
0100	0200		Canada, CKZU Vancouver BC	6160do			
0100	0130		Canada, R Canada International	5960am	9755am	11715am	13670am
				15170am	15305am		
0100	0200		Costa Rica, R for Peace Intl	6970va	15049va	25930al	
0100	0200		Costa Rica, University Network	5030am	6150va	7375na	9725na
				11870va	13749af		
0100	0200		Cuba, Radio Havana	6000na	9820na	11705na	
0100	0127		Czech Rep, Radio Prague Intl	7345na	11615na		
0100	0200		Ecuador, HCJB	9745na	15115na	21455va	
0100	0115		Finland, YLE/R Finland	11985na	13770na		
0100	0145		Germany, Deutsche Welle	6040na	9640am	11810na	13720am
0100	0130	s	Germany, Universal Life	9435as			
0100	0200		Guyana, Voice of	3289do	5949do		
0100	0130		Hungary, Radio Budapest	9560na			
0100	0200		Indonesia, Voice of	9525va	11784va	15149va	
0100	0130		Iran, VOIRI	9022am	9835ca	11970na	
0100	0200	as	Italy, IRRS	7120va			
0100	0110		Itay, RAI International	6010na	9675na	11800na	
0100	0200		Japan, Radio	9515me	11860as	11870me	15325as
				15590as	17685pa	17835sa	17845pa
0100	0200		Kenya, Kenya BC Corp	4885do	4915do	4935do	
0100	0130		Kiribati, Radio	9809do	9825do		
0100	0200		Malaysia, Radio	7295do			
0100	0200		Malaysia, RTM Kota Kinabalu	5980do			
0100	0200		Namibia, Namibian BC Corp	3270af	3289af		
0100	0130		Netherlands, Radio	6165na	9845na		
0100	0200		New Zealand, R New Zealand Int	17675va			
0100	0200		New Zealand, ZLXA	3935do	7290do		
0100	0156		North Korea, R Pyongyang	3560va	11735va	15229va	17734va
0100	0200	vl	Papua New Guinea, NBC	9675do	11880do		
0100	0200		Russia, Voice of Russia WS	9665na	11990na	11990na	12045as
				15595na	17595na		
0100	0200		Singapore R Corp of Singapore	6150do			
0100	0130		Slovakia, R Slovakia International	5930na	7230ca	9440sa	
0100	0200	vl/as	Solomon Islands, SIBC	5020do			
0100	0200	vl/a	Solomon Islands, SIBC	9545do			
0100	0200		Spain, R Exterior Espana	6055na			
0100	0200		Sri Lanka, Sri Lanka BC Corp	4940do	6005as	6075as	9730as
				15425as			
0100	0130		Switzerland, Swiss R International	9885am	9905am		
0100	0200		UK, BBC World Service	5965as	5975na	6175na	6195as
				9410me	9590am	9915sa	11955as
				12095sa	15280as	15310as	15360as
				17790as			
0100	0200		USA, Armed Forces Network	4278am	6458am	12689am	
0100	0200		USA, KAIJ Dallas TX	5755va			
0100	0200		USA, KJES Vado NM	7555na			
0100	0200		USA, KTBN Salt Lake City UT	7510na			
0100	0200		USA, KWHR Naalehu HI	17510as			
0100	0130	twhfa	USA, Voice of America	5995am	6130ca	7405am	9455af
				9775am	13740am		
0100	0200		USA, Voice of America	7115as	9635as	11705as	11725as
				11820as	13650as	15250as	17740as
				17820as			
0100	0200		USA, WBCQ Monticello ME	7415na	9330na		
0100	0200		USA, WEWN Birmingham AL	5825na	13615na		
0100	0200		USA, WGTG McCaysville GA	5085va	6890am		
0100	0200		USA, WHRA Greenbush ME	7580na			
0100	0200		USA, WHRI Noblesville IN	5745na	7315sa		
0100	0200		USA, WINB Red Lion PA	12160am			
0100	0200		USA, WJCR Upton KY	7490va	13594as		
0100	0200	twhfa	USA, WRMI Miami FL	7385na			
0100	0200	sm	USA, WRMI Miami FL	9955am			
0100	0200		USA, WRNO New Orleans LA	7355na			
0100	0200		USA, WSHB Cypress Crk SC	9430na	15285am		
0100	0200		USA, WTJC Newport NC	9370na			
0100	0200		USA, WWCR Nashville TN	3215na	5070na	7435na	13845na
0100	0200		USA, WYFR Okeechobee FL	6065na	15165as		
0100	0130		Uzbekistan, Radio Tashkent	7190as	9375as	9530as	
0100	0200	vl	Vanuatu, Radio	3945do	4960do	7260do	
0100	0127		Vietnam, Voice of	7250na	9695na		
0105	0110		Croatia, Croatian Radio	9925na			
0130	0200		Austria, R Austria International	9655na	9870am	13730am	
0130	0159		Canada, R Canada International	5960am	9755am		
0130	0159	sm	Canada, R Canada International	11715am	15170am	15305am	
0130	0145	VL	Libya, Voice of Africa	11815af	15415af	15435va	
0130	0200		Slovakia, Adventist World Radio	11600as			
0130	0200		Sweden, Radio	13625as			
0130	0200		UK, RTE Radio	6155am			
0130	0200	twhfa	USA, VOA Special English	7405am	9775am	13740am	
0130	0200	twhfa	USA, Voice of America	5995am	6130ca	9455af	
0140	0200		Vatican City, Vatican Radio	9650au	12055au		
0145	0200		Albania, R Tirana International	6115na	7160na		

Selected Programs

Sundays

0100 UK, BBC London (am/east as/south as): The World Today. The World Service breakfast program.
0130 UK, BBC London (am): Reporting Religion. See S 0030.
0130 UK, BBC London (east as): In Praise of God. Weekly programme of worship and meditation.
0130 UK, BBC London (south as): Assignment. A weekly examination of a topical issue.
0145 UK, BBC London (am): Letter from America. Alistair Cooke shares his inimitable view of contemporary American life.

Monday-Friday

0100 UK, BBC London (am/east as): News. See S 1200.
0100 UK, BBC London (south as): The World Today. See S 0100.

Mondays

0105 UK, BBC London (am): Wright Round the World. See S 1305.
0105 UK, BBC London (east as): Talking Point. See S 1405.
0145 UK, BBC London (east as): Off the Shelf. Daily readings from the best of world literature.

Tuesdays

0105 UK, BBC London (am): Health Matters. See M 1105.
0105 UK, BBC London (east as): Outlook. See M 1205.
0130 UK, BBC London (am): Everywoman. See M 1130.
0145 UK, BBC London (east as): Off the Shelf. See M 0145.

Wednesdays

0105 UK, BBC London (am): Science Perspective (7th,21st). See T 1105.
0105 UK, BBC London (am): From Lab to Law (14th). See T 1105.
0105 UK, BBC London (am): Following Trends (28th). See T 1105.
0105 UK, BBC London (east as): Outlook. See M 1205.
0115 UK, BBC London (am): Seeing Stars (7th). See T 1115.
0115 UK, BBC London (am): Soundbyte (21st). See T 1115.
0130 UK, BBC London (am): Focus on Faith. See T 1130.
0145 UK, BBC London (east as): Off the Shelf. See M 0145.

Thursdays

0105 UK, BBC London (am): Sports International. See W 1105.
0105 UK, BBC London (east as): Outlook. See M 1205.
0130 UK, BBC London (am): From Our Own Correspondent. See S 0230.
0145 UK, BBC London (east as): Off the Shelf. See M 0145.

Fridays

0105 UK, BBC London (am): One Planet. See M 0305.
0105 UK, BBC London (east as): Outlook. See M 1205.
0130 UK, BBC London (am): People and Places. See M 0330.
0145 UK, BBC London (am): People and Places. See M 0330.
0145 UK, BBC London (east as): Off the Shelf. See M 0145.

Saturdays

0100 UK, BBC London (am/east as): News. See S 1200.
0100 UK, BBC London (south as): The World Today. See S 0100.
0105 UK, BBC London (am): Discovery. See M 1105.
0105 UK, BBC London (east as): Outlook. See M 1205.
0130 UK, BBC London (am): Variable Feature. See S 1105.
0130 UK, BBC London (south as): People and Politics. See F 0645.
0145 UK, BBC London (east as): Waveguide (4). See M 0345.
0145 UK, BBC London (east as): Write On. See M 0345.

Hauser's Highlights

AUSTRALIA: Radio Australia
A-00 English schedule, portion of interest in NAm with kW powers and bearings from Shepparton 100 kW:

2100-0000	17715	030
0000-0800	17580	030
2100-0100	21740	070
2200-0200	17795	050
0200-0700	15515	070
0700-0900	15240	090
0800-1200	13605	030
1100-2130	9580	070
1100-1400	6020	030
1200-1700	11650	030
1400-1800	5995	030

(Nigel Holmes, RA Transmission Manager via Rachel Baughn)

Hauser's Highlights

ISRAËL: Kol Yisraël
English times during DST, as announced:
0400 on 9435 15640 17535
1030 on 15640 17535
1400 on 15650 17535
1900 on 11605 15640 15650 17535
(Joel Rubin, NY, *DX Listening Digest*)

Frequencies

0200	0300		Anguilla, Caribbean Beacon	6090am				
0200	0300	twhfa	Argentina, RAE	11710am				
0200	0300	vl	Australia, ABC/Alice Springs	4835do				
0200	0300	vl	Australia, ABC/Katherine	5025do				
0200	0300	vl	Australia, ABC/Tennant Creek	4910do				
0200	0300		Australia, Radio	9660pa	12080va	15240pa	15415as	
				15515va	17580pa	17750as	21725pa	
0200	0210		Bangladesh, Bangla Betar	4882as				
0200	0230	smwfa	Belarus, Radio Minsk	7210va	11670va			
0200	0300		Bulgaria, Radio	9400na	11700na			
0200	1215		Cambodia, National Radio Of	11940as				
0200	0300		Canada, CBC Northern Service	9625do				
0200	0300		Canada, CFRX Toronto ON	6070do				
0200	0300		Canada, CFVP Calgary AB	6030do				
0200	0300		Canada, CHNX Halifax NS	6130do				
0200	0300		Canada, CKZN St John's NF	6160do				
0200	0300		Canada, CKZU Vancouver BC	6160do				
0200	0229		Canada, R Canada International	9755am	11715am	13670am	15170am	
				15305am				
0200	0300		Costa Rica, R for Peace Intl	6970va	15049va	25930al		
0200	0300		Costa Rica, University Network	5030am	6150va	7375na	9725na	
				11870va	13749af			
0200	0300		Cuba, Radio Havana	6000na	9820na	11705na		
0200	0300		Ecuador, HCJB	9745na	15115na	21455va		
0200	0300		Egypt, Radio Cairo	9475am				
0200	0245		Germany, Deutsche Welle	9615as	11945as	11965as		
0200	0300	mtwhf	Greece, Voice of	7450va	9420va	12110va	15630va	
0200	0300		Guyana, Voice of	3289do	5949do			
0200	0300		Kenya, Kenya BC Corp	4885do	4915do	4935do		
0200	0300		Malaysia, Radio	7295do				
0200	0300		Malaysia, RTM Kota Kinabalu	5980do				
0200	0230		Myanmar, Radio	7185do				
0200	0300		Namibia, Namibian BC Corp	3270af	3289af			
0200	0300		New Zealand, R New Zealand Int	17675va				
0200	0300		New Zealand, ZLXA	3935do	7290do			
0200	0256		North Korea, R Pyongyang	11844va	13649va			
0200	0300	vl	Papua New Guinea, NBC	9675do	11880do			
0200	0256		Romania, R Romania International	9510na	9570na	11885na	11940as	
				15105pa	15380pa	17790pa		
0200	0300		Russia, Voice of Russia WS	9665na	11990na	13690na	15595na	
				17595na				
0200	0300		Singapore R Corp of Singapore	6150do				
0200	0300	vl/as	Solomon Islands, SIBC	5020do				
0200	0300	vl/a	Solomon Islands, SIBC	9545do				
0200	0300		South Korea, R Korea Intl	7275as	11725sa	11810sa	15575na	
0200	0300		Sri Lanka, Sri Lanka BC Corp	6005as	6075as	6130do	9730as	
				15425as				
0200	0300		Taiwan, R Taiwan International	5950na	9680na	11740as	11825pa	
				15345as				
0200	0300		UK, BBC World Service	5975na	6135am	6175na	6195eu	
				9410eu	9770af	9915sa	11760me	
				11955as	12095sa	15280as	15310as	
				15360as	17790as			
0200	0230	a	UK, Wales Radio Intl/Merlin	9765na				
0200	0300		USA, Armed Forces Network	4278am	6458am	12689am		
0200	0300		USA, KAIJ Dallas TX	5755va				
0200	0230		USA, KJES Vado NM	7555na				
0200	0300		USA, KTBN Salt Lake City UT	7510na				
0200	0300		USA, KWHR Naalehu HI	17510as				
0200	0300		USA, Voice of America	7115as	9635as	11705as	11725as	
				11820as	13650as	15250as	17740as	
				17820as				
0200	0300		USA, WBCQ Monticello ME	7415na	9330na			
0200	0300		USA, WEWN Birmingham AL	5825va				
0200	0300		USA, WGTG McCaysville GA	5085va	6890am			
0200	0300		USA, WHRA Greenbush ME	7580na				
0200	0300		USA, WHRI Noblesville IN	5745na	7315sa			
0200	0300		USA, WINB Red Lion PA	12160am				
0200	0300		USA, WJCR Upton KY	7490va	13594as			
0200	0300		USA, WRMI Miami FL	7385na				
0200	0300		USA, WRNO New Orleans LA	7355na				
0200	0300		USA, WSHB Cypress Crk SC	7535na	9430na			
0200	0300		USA, WTJC Newport NC	9370na				
0200	0300		USA, WWCR Nashville TN	3215na	5070na	5935na	7435na	
0200	0300		USA, WYFR Okeechobee FL	6065na	9505na			
0200	0300	vl	Vanuatu, Radio	3945do	4960do	7260do		
0205	0210		Croatia, Croatian Radio	9925na				
0215	0220		Nepal, Radio	5005as	7165as			
0230	0300		Albania, R Tirana International	6115na	7160na			
0230	0300		Hungary, Radio Budapest	9835na				
0230	0300		Sweden, Radio	9495na				
0230	0257		Vietnam, Voice of	7250na	9695na			
0250	0300		Vatican City, Vatican Radio	7305am	9605am			
0250	0300	vl	Zambia, National BC Corp	6165do	6265do			
0257	0300	vl	Malawi, Malawi BC Corp	3380do				

Selected Programs

Sundays

0200 BBC (am/east af/east as/me/south as): The World Today. See S 0100.
0230 BBC (am/east as/me/south as): From Our Own Correspondent. BBC correspondents comment on the background to the news.

Mondays

0200 BBC (am/east af/me/south as): The World Today. See S 0100.
0200 BBC (east as): News. See S 1200.
0205 BBC (east as): Meridian Ideas. The edition that explores big cultural ideas.
0230 BBC (am): Assignment. See S 0130.
0230 BBC (east as): The Music Mix. An insight into a current popular music genre.

Tuesdays

0200 BBC (am/east af/me/south as): The World Today. See S 0100.
0200 BBC (east as): News. See S 1200.
0205 BBC (east as): Meridian Screen. Interviews, documentaries, features and discussions.
0230 BBC (am): World Business Report. See S 0630.
0230 BBC (east as): The UK Top Twenty. Tim Smith presents the UK's pop countdown.
0245 BBC (am): Analysis. See M 0645.

Wednesdays

0200 BBC (am/east af/me/south as): The World Today. See S 0100.
0200 BBC (east as): News. See S 1200.
0205 BBC (east as): Meridian Music. An in-depth look at the classical music of the world.
0230 BBC (am): World Business Report. See S 0630.
0230 BBC (east as): Westway. The World Service's first-ever regular drama (soap opera) serial.
0245 BBC (am): Analysis. See M 0645.
0245 BBC (east as): The UK Album Chart. Tim Smith counts down the top ten UK album chart and plays the week's highest entries and climbers.

Thursdays

0200 BBC (am/east af/me/south as): The World Today. See S 0100.
0200 BBC (east as): News. See S 1200.
0205 BBC (east as): Meridian Writing. The literature edition.
0230 BBC (am): World Business Report. See S 0630.
0230 BBC (east as): Andy Kershaw's World of Music. Recordings of diverse music from around the world.
0245 BBC (am): Analysis. See M 0645.

Fridays

0200 BBC (am/east af/me/south as): The World Today. See S 0100.
0200 BBC (east as): News. See S 1200.
0205 BBC (east as): Meridian Masterpiece. See M 0505.
0230 BBC (am): World Business Report. See S 0630.
0230 BBC (east as): Music X-Press. A chance to hear the most creative new pop music and to hear it discussed by musical experts.
0245 BBC (am): Analysis. See M 0645.

Saturdays

0200 BBC (am/east af/east as/me/south as): The World Today. See S 0100.
0230 BBC (am): World Business Report. See S 0630.
0230 BBC (east af): Arts in Action. See S 0030.
0230 BBC (east as/me/south as): Global Business. See S 0430.
0245 BBC (am): Analysis. See M 0645.

Hauser's Highlights

SOUTH AFRICA: Channel Africa
English until 29 October 2000 with kW, daily unless noted.
0300-0330 6035 500 E&CAf
0400-0430 5955 500 SAf
0500-0530 11720 500 WAf
0600-0630 15215 500 WAf
1300-1455 21725 250 WAf Sat only
1300-1455 17780 250 E&CAf Sun only
1300-1455 11720 100 SAf Sat-Sun
1500-1530 17770 500 E&CAf
1600-1630 9525 500 SAf
1700-1730 17860 500 WAf
1800-1830 17870 500 WAf
(Channel Africa web site via John Norfolk)

Frequencies

0300	0400		Anguilla, Caribbean Beacon	6090am			
0300	0400	vl	Australia, ABC/Alice Springs	4835do			
0300	0400	vl	Australia, ABC/Katherine	5025do			
0300	0400	vl	Australia, ABC/Tennant Creek	4910do			
0300	0400		Australia, Radio	9660pa	12080va	15240pa	
				15415as	15515va	17580pa	
				17750as	21725pa		
0300	0400	vl	Botswana, Radio	3356do	4820do	7255do	
0300	0400		Canada, CBC Northern Service	9625do			
0300	0400		Canada, CFRX Toronto ON	6070do			
0300	0400		Canada, CFVP Calgary AB	6030do			
0300	0400		Canada, CHNX Halifax NS	6130do			
0300	0400		Canada, CKZN St John's NF	6160do			
0300	0400		Canada, CKZU Vancouver BC	6160do			
0300	0356		China, China Radio International	9690na			
0300	0400		Costa Rica, Faro del Caribe	5054ca	6175ca	9644ca	
0300	0400		Costa Rica, R for Peace Intl	6970va	15049va		
0300	0400		Costa Rica, University Network	5030am	6150va	7375na	9725na
				11870va	13749af		
0300	0400		Cuba, Radio Havana	6000na	9820na	11705na	
0300	0327		Czech Rep, Radio Prague Intl	7345na	7385na	11615na	
0300	0400		Ecuador, HCJB	9745na	15115na	21455va	
0300	0330		Egypt, Radio Cairo	9475am			
0300	0345		Germany, Deutsche Welle	9535na	9640na	11810na	
				13780am	15105na		
0300	0400	vl	Guatemala, Radio Cultural	3300do	5955do		
0300	0400		Guyana, Voice of	3289do	5949do		
0300	0400	sm	Honduras, Radio Luz y Vida	3250ca			
0300	0400	irreg	Iraq, Radio Iraq International	9684va	11787va		
0300	0400		Japan, Radio	17825ca	21610pa		
0300	0400		Kenya, Kenya BC Corp	4885do	4915do	4935do	
0300	0400	vl	Lesotho, Radio	4800do			
0300	0400		Malaysia, Radio	7295do			
0300	0400		Malaysia, Voice of Islam	6175as	9750as	15295as	
0300	0400	stwhfa	Mexico, R Mexico International	9705am			
0300	0400		Namibia, Namibian BC Corp	3270af	3289af		
0300	0400		New Zealand, R New Zealand Int	17675va			
0300	0400		Oman, Radio Sultanate of	15355va			
0300	0400	vl	Papua New Guinea, NBC	9675do	11880do		
0300	0400		Russia, Voice of Russia WS	7125na	9665na	11990na	
				15595na	17595na	17650na	
				17660na	17690na		
0300	0400	vl	Rwanda, Radio	6055do			
0300	0330		S Africa, Adventist World Radio	6015af			
0300	0330		S Africa, Channel Africa	6035af			
0300	0400		Singapore R Corp of Singapore	6150do			
0300	0400	vl/as	Solomon Islands, SIBC	5020do			
0300	0400	vl/a	Solomon Islands, SIBC	9545do			
0300	0400		Sri Lanka, Sri Lanka BC Corp	6005as	6075as	6130do	9730as
				15425as			
0300	0400		Taiwan, R Taiwan International	5950na	9680na	11745as	11825as
				15345as			
0300	0330		Thailand, Radio	9655na	11905am	15395na	
0300	0400		Turkey, Voice of	6155va	11655as	21715as	
0300	0400		Uganda, Radio	4976do	5026do		
0300	0400		UK, BBC World Service	3255af	5975na	6005af	6135am
				6175na	6190af	6195eu	7120af
				7160af	9410eu	11730af	11760me
				11955as	12095af	15280as	15310as
				15360as	17760as	17790as	21660as
0300	0400		Ukraine, R Ukraine International	6020eu	9640eu	12045eu	
0300	0400		USA, Armed Forces Network	4278am	6458am	12689am	
0300	0400		USA, KAIJ Dallas TX	5755va			
0300	0400		USA, KTBN Salt Lake City UT	7510na			
0300	0400	vl	USA, KVOH Los Angeles CA	9975am			
0300	0400		USA, KWHR Naalehu HI	17510as			
0300	0330	smtwh	USA, Voice of America	4960af			
0300	0400		USA, Voice of America	6080af	6115af	7105af	7275af
				7290af	7340af	9575af	9885af
				17725af			
0300	0400		USA, WBCQ Monticello ME	7415na	9330na		
0300	0400		USA, WEWN Birmingham AL	5825va			
0300	0400		USA, WGTG McCaysville GA	5085va	6890am		
0300	0400		USA, WHRA Greenbush ME	7580na			
0300	0400		USA, WHRI Noblesville IN	5745na	7315sa		
0300	0400		USA, WINB Red Lion PA	12160am			
0300	0400		USA, WJCR Upton KY	7490va	13594as		
0300	0400	mtwhfa	USA, WMLK Bethel PA	9465eu			
0300	0400		USA, WRMI Miami FL	7385na			
0300	0400		USA, WRNO New Orleans LA	7395na			
0300	0400		USA, WSHB Cypress Crk SC	11930eu			
0300	0400		USA, WTJC Newport NC	9370na			
0300	0400		USA, WWCR Nashville TN	3215na	5070na	5935na	7435na
0300	0400		USA, WYFR Okeechobee FL	6065na	9505na		
0300	0400	vl	Vanuatu, Radio	3945do	4960do	7260do	
0300	0310		Vatican City, Vatican Radio	7305am	9605am		
0300	0400	vl	Zambia, National BC Corp	6165do	6265do		
0300	0400	vl	Zimbabwe, Zimbabwe BC Corp	4828do	6045do		
0305	0310		Croatia, Croatian Radio	9925na			
0310	0340		Vatican City, Vatican Radio	9660af			
0330	0357		Czech Rep, Radio Prague Intl	11600as	15470as		
0330	0345	vl	Libya, Voice of Africa	11815af	15415af	15435va	
0330	0400		Sweden, Radio	9495na			
0330	0400		UAE, Radio Dubai	12005na	13675na	15400na	
0330	0357		Vietnam, Voice of	9795na	9830na		
0345	0400	f	Seychelles, FEBA Radio	11885af			
0357	0400	vl	Malawi, Malawi BC Corp	5995do			
0359	0400		Zambia, Christian Voice	6065do			

Selected Programs

Sundays

0300 BBC (am/east af/east as/me/south as): News Briefing. See S 0000.
0320 BBC (am/east af/east as/me/south as): Sports Roundup. See S 0020.
0320 BBC (east af): Sports Roundup. See S 0020.
0330 BBC (am): Science in Action. The latest in science and technology.
0330 BBC (east af): Postmark Africa. Expert answers to any question under the sun.
0330 BBC (east as/me/south as): Science in Action. See S 0330.

Monday-Friday

0300 BBC (am/east af/me): News Briefing. See S 0000.
0300 BBC (east as/south as): News. See S 1200.
0330 BBC (me): World Business Review. See M 0030.
0345 BBC (south as): Off the Shelf. See M 0145.
0330 BBC (east af): Network Africa. Breakfast show of news, sport, personalities, music, and listener's comments.

Mondays

0305 BBC (east as): One Planet. Charles Haviland and Richard Black host this new program about development and the environment.
0305 BBC (south as): Talking Point. See S 1405.
0320 BBC (am/east af/me): Sports Roundup. See S 0020.
0330 BBC (am): World Business Report. See S 0630.
0330 BBC (east as): People and Places. A forum to exchange views and experience on a global scale.
0345 BBC (me): Waveguide (26th). The latest info on international broadcasting w/ reviews of rcvrs and news about reception.
0345 BBC (me): Write On. Air your views about World Service; write to PO Box 76, Bush House, Strand, London WC2B 4PH.
0345 BBC (am): Letter from America. See S 0145.

Tuesday-Saturday

0305 BBC (south as): Outlook. See M 1205.
0320 BBC (east af/me): Sports Roundup. See S 0020.

Tuesdays

0305 BBC (am): Omnibus. See S 0430.
0305 BBC (east as): Discovery. See M 1105.
0330 BBC (am): Body and Mind. A new health strand which deals with how health and medicine relates to you.
0330 BBC (east as): Variable Feature. See S 1105.
0345 BBC (me): Analysis. See M 0645.

Wednesdays

0305 BBC (am): John Peel. See S 1205.
0305 BBC (east as): Health Matters. See M 1105.
0330 BBC (am): Patterns of Faith. See M 1245.
0330 BBC (east as): Everywoman. See M 1130.
0345 BBC (me): Analysis. See M 0645.

Thursdays

0305 BBC (am): The Greenfield Collection. See S 2330.
0305 BBC (east as): Science Perspective (8th,22nd). See T 1105.
0305 BBC (east as): From Lab to Law (15th). See T 1105.
0305 BBC (east as): Following Trends (29th). See T 1105.
0315 BBC (east as): Seeing Stars (8th). See T 1115.
0315 BBC (east as): Soundbyte (22nd). See T 1115.
0330 BBC (am): Plain English. See M 1230.
0330 BBC (east as): Focus on Faith. See T 1130.
0345 BBC (me): From Our Own Correspondent. See S 0230.

Fridays

0305 BBC (am): Jazzmatazz. See S 1305.
0305 BBC (east as): Sports International. See W 1105.
0330 BBC (am): Heart and Soul. See T 1230.
0330 BBC (east as): Pick of the World. See W 1130.
0345 BBC (me): Analysis. See M 0645.

Saturdays

0300 BBC (am/east as/south as): News. See S 1200.
0300 BBC (east af/me): News Briefing. See S 0000.
0305 BBC (am): Variable Comedy/Quiz Feature. See S 1305.
0305 BBC (east as): Wright Round the World. See S 1305.
0330 BBC (am): Write On. See M 0345.
0330 BBC (am): Waveguide (24th). See M 0345.
0330 BBC (east af): This Week and Africa. A roundup of the week's political developments across the continent.
0330 BBC (me): World Business Report. See S 0630.
0345 BBC (me): Analysis. See M 0645.
0345 BBC (south as): Write On. See M 0345.
0345 BBC (south as): Waveguide (24th). See M 0345.

Frequencies

0400	0500		Anguilla, Caribbean Beacon	6090am			
0400	0500	vl	Australia, ABC/Alice Springs	4835do			
0400	0500	vl	Australia, ABC/Katherine	5025do			
0400	0500	vl	Australia, ABC/Tennant Creek	4910do			
0400	0500		Australia, Radio	9660pa	12080va	15240pa	15415as
				15515va	17580pa	17750as	21725pa
0400	0430		Belgium, Radio Vlaanderen Intl	15565am			
0400	0500	vl	Botswana, Radio	3356do	4820do	7255do	
0400	0500	vl	Cameroon, RTV/Yaounde	4850do			
0400	0500		Canada, CBC Northern Service	9625do			
0400	0500		Canada, CFRX Toronto ON	6070do			
0400	0500		Canada, CFVP Calgary AB	6030do			
0400	0500		Canada, CHNX Halifax NS	6130do			
0400	0500		Canada, CKZN St John's NF	6160do			
0400	0500		Canada, CKZU Vancouver BC	6160do			
0400	0429	as	Canada, R Canada International	11835me	11975me	15215me	
0400	0429	mtwhf	Canada, R Canada International	13765af	15345af		
0400	0456		China, China Radio International	9730na			
0400	0500		Costa Rica, R for Peace Intl	6970va	15049va		
0400	0500		Costa Rica, University Network	5030am	6150va	7375na	9725na
				11870va	13749af		
0400	0500		Cuba, Radio Havana	6000na	9820na	11705na	
0400	0500		Ecuador, HCJB	9745na	15115na	21455va	
0400	0445		Germany, Deutsche Welle	7225af	9565af	9765af	13690af
0400	0500	vl	Guatemala, Radio Cultural	3300do	5955do		
0400	0500		Guyana, Voice of	3289do	5949do		
0400	0430		Israel, Kol Israel	9435va	15640va	17535va	
0400	0500		Kenya, Kenya BC Corp	4885do	4915do	4935do	
0400	0500	vl	Lesotho, Radio	4800do			
0400	0500	vl	Malawi, Malawi BC Corp	3380do	5995do		
0400	0500		Malaysia, Radio	7295do			
0400	0500		Malaysia, Voice of Islam	6175as	9750as	15295as	
0400	0430	twhfa	Mexico, R Mexico International	9705am			
0400	0500		Namibia, Namibian BC Corp	3270af	3289af		
0400	0500		New Zealand, R New Zealand Int	17675va			
0400	0500		New Zealand, ZLXA	3935do	7290do		
0400	0500	vl	Nigeria, Radio/Enugu	6025do			
0400	0430	vl	Nigeria, Radio/Kaduna	6090do	7275do		
0400	0500	vl	Papua New Guinea, NBC	9675do	11880do		
0400	0456		Romania, R Romania International	11940na	15105na	15335as	17745as
0400	0500		Russia, Voice of Russia WS	7125na	9665na	11990na	15595na
				17565na	17650na	17660na	17690na
0400	0500	vl	Rwanda, Radio	6055do			
0400	0430		S Africa, Channel Africa	5955af			
0400	0500		Singapore R Corp of Singapore	6150do			
0400	0500	vl/as	Solomon Islands, SIBC	5020do			
0400	0500	vl/a	Solomon Islands, SIBC	9545do			
0400	0430		Sri Lanka, Sri Lanka BC Corp	6005as	6075as	6130do	9730as
				15425as			
0400	0430		Switzerland, Swiss R International	9610eu	9885am	9905am	
0400	0500		Uganda, Radio	4976do	5026do		
0400	0500		UK, BBC World Service	3255af	5975na	6005af	6005af
				6135am	6175na	6190af	6195eu
				7120af	7160af	9410eu	11760me
				12095eu	15280as	15310as	15420af
				15575me	17640af	17760as	17790as
				21660as	21830as		
0400	0500		USA, Armed Forces Network	4278am	6458am	12689am	
0400	0500		USA, KAIJ Dallas TX	5755va			
0400	0500		USA, KTBN Salt Lake City UT	7510na			
0400	0500	vl	USA, KVOH Los Angeles CA	9975am			
0400	0500		USA, KWHR Naalehu HI	17780as			
0400	0500		USA, Voice of America	6080af	7170va	7265af	7275af
				7290af	9575af	9885af	11965me
				15205va	17725af		
0400	0500		USA, WBCQ Monticello ME	7415na	9330na		
0400	0500		USA, WEWN Birmingham AL	5825va			
0400	0500		USA, WGTG McCaysville GA	5085va	6890am		
0400	0500		USA, WHRA Greenbush ME	7580na			
0400	0500		USA, WHRI Noblesville IN	5745na	7315sa		
0400	0500		USA, WJCR Upton KY	7490va	13594as		
0400	0500	mtwhfa	USA, WMLK Bethel PA	9465eu			
0400	0500	stwhfa	USA, WRMI Miami FL	7385na			
0400	0500	m	USA, WRMI Miami FL	9955am			
0400	0500		USA, WRNO New Orleans LA	7395na			
0400	0500		USA, WSHB Cypress Creek, SC	11930eu	15195af		
0400	0500		USA, WTJC Newport NC	9370na			
0400	0405		USA, WWCR Nashville TN	5070na	5935na	7435na	
0400	0405	sm	USA, WWCR Nashville TN	3210na	3210na		
0400	0405	twhfa	USA, WWCR Nashville TN	3215na			
0400	0455		USA, WYFR Okeechobee FL	6065na	9505na	9985eu	
0400	0500		Zambia, Christian Voice	6065do			
0400	0500	vl	Zambia, National BC Corp	6165do	6265do		
0400	0500	vl	Zimbabwe, Zimbabwe BC Corp	4828do	6045do		
0405	0410		Croatia, Croatian Radio	9925na			
0405	05000		USA, WWCR Nashville TN	3210na	5070na	5935na	7435na
0425	0440		Itay, RAI International	5975af	7150af		
0430	0500		Austria, R Austria International	6015na	6155eu	13730eu	
0430	0500		Italy, IRRS	3985va			
0430	0500		Netherlands, Radio	6165na	9590na		
0430	0500	vl	Nigeria, Radio/Ibadan	6050do			
0430	0500	vl	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do
0430	0500	vl	Nigeria, Radio/Lagos	3326do	4990do		
0430	0500		S Africa, World Beacon	6115af			
0430	0500		Serbia, Radio Yugoslavia	9580na			
0430	0500		Sri Lanka, Sri Lanka BC Corp	6130do			
0430	0500		Swaziland, Trans World Radio	3200af	4775af		
0430	0500		Switzerland, Swiss R International	9885am	9905am		
0445	0500		USA, WYFR Okeechobee FL	9985eu			

Selected Programs

Sundays

0400 BBC (am/east af/east as/eu/me/south as): The World Today. See S 0100.
0430 BBC (east af): African Perspective. A considered view of life and issues facing the African continent.
0430 BBC (east as): Omnibus. Each week a half-hour programme on practically any topic under the sun.
0430 BBC (eu): Global Business. Roger White presents this weekly series of interviews, features and discussions with the movers and shakers of the international business community.
0430 BBC (me/south as): In Praise of God. See S 0130.
0450 BBC (am): Sports Roundup. See S 0020.

Monday-Friday

0400 BBC (am/east af/east as/eu/me): The World Today. See S 0100.
0400 BBC (south as): News. See S 1200.
0430 BBC (east as): Sports Roundup. See S 0020.
0450 BBC (eu/me): Sports Roundup. See S 0020.

Mondays

0405 BBC (south as): Meridian Ideas. See M 0205.
0430 BBC (east af): Network Africa. See M 0330.
0430 BBC (south as): The Music Mix. See M 0230.
0450 BBC (am): Sports Roundup. See S 0020.

Tuesdays

0405 BBC (south as): Meridian Screen. See T 0205.
0430 BBC (east af): Network Africa. See M 0330.
0430 BBC (south as): The UK Top Twenty. See T 0230.
0450 BBC (am): Sports Roundup. See S 0020.

Wednesdays

0405 BBC (south as): Meridian Music. See W 0205.
0430 BBC (east af): Network Africa. See M 0330.
0430 BBC (south as): The UK Album Chart. See W 0245.
0450 BBC (am): Sports Roundup. See S 0020.

Thursdays

0405 BBC (south as): Meridian Writing. See H 0205.
0430 BBC (east af): Network Africa. See M 0330.
0430 BBC (south as): Andy Kershaw's World of Music. See H 0230.
0450 BBC (am): Sports Roundup. See S 0020.

Fridays

0405 BBC (south as): Meridian Masterpiece. See M 0505.
0430 BBC (east af): Network Africa. See M 0330.
0430 BBC (south as): Music X-Press. See F 0230.
0450 BBC (am): Assignment. See S 0130.

Saturdays

0400 BBC (am/east af/east as/eu/me/south as): The World Today. See S 0100.
0430 BBC (am): Global Business. See S 0430.
0430 BBC (east af): Talkabout Africa. See W 1630.
0430 BBC (east as): Assignment. See S 0130.
0430 BBC (eu): Weekend. European magazine program co-produced by European broadcasters.
0430 BBC (me/south as): Assignment. See S 0130.

Hauser's Highlights

SEYCHELLES: FEBA
A-00 in English with azimuth, broad/narrow beam, kW power:
1500-1600 daily SAs 11600 040 B 100
0345-0400 Fri EAf 11885 280 B 75
0815-0900 Fri SAs 15460 052 N 100
1245-1300 Fri ME 15535 340 B 100
1630-1700 Sun SAs 11605 052 N 100
(FEBA via Wolfgang Büschel, *DX Listening Digest*)

Frequencies

0500	0600		Anguilla, Caribbean Beacon	6090am			
0500	0600	vl	Australia, ABC/Alice Springs	4835do			
0500	0600	vl	Australia, ABC/Katherine	5025do			
0500	0600	vl	Australia, ABC/Tennant Creek	4910do			
0500	0600		Australia, Radio	9660pa	12080va	15240pa	15515va
				17580pa	21725pa		
0500	0600	as	Australia, Radio	17750as			
0500	0600	vl	Botswana, Radio	3356do	4820do	7255do	
0500	0600	vl	Cameroon, RTV/Yaounde	4850do			
0500	0515		Canada, CBC Northern Service	9625do			
0500	0600		Canada, CFRX Toronto ON	6070do			
0500	0600		Canada, CFVP Calgary AB	6030do			
0500	0600		Canada, CHNX Halifax NS	6130do			
0500	0600		Canada, CKZN St John's NF	6160do			
0500	0600		Canada, CKZU Vancouver BC	6160do			
0500	0529		Canada, R Canada International	5995am	6145va	7290va	9595va
				9755am	11710va	11830am	13755va
				15330va			
0500	0556		China, China Radio International	9560na			
0500	0600		Costa Rica, R for Peace Intl	6970va	15049va		
0500	0600		Costa Rica, University Network	5030am	6150va	7375na	9725na
				11870va	13749af		
0500	0600		Cuba, Radio Havana	9550na	9820na	9830na	
0500	0600		Ecuador, HCJB	9745na	15115na	21455va	
0500	0545		Germany, Deutsche Welle	9670na	9785na	11810na	11985na
0500	0600		Guyana, Voice of	3289do	5949do		
0500	0600		Italy, IRRS	3985va			
0500	0600		Japan, Radio	5975eu	6110na	7230eu	11715as
				11760as	11840as	13630na	15590pa
0500	0600		Kenya, Kenya BC Corp	4885do	4915do	4935do	
0500	0600		Kiribati, Radio	9809do	9825do		
0500	0600		Kuwait, Radio	15110as	15230as		
0500	0600	vl	Lesotho, Radio	4800do			
0500	0600	vl	Liberia, R Liberia International	5100do			
0500	0600	vl	Malawi, Malawi BC Corp	3380do	5995do		
0500	0600		Malaysia, Radio	7295do			
0500	0600		Malaysia, RTM Sarawak	7160do			
0500	0600		Malaysia, Voice of Islam	6175as	9750as	15295as	
0500	0600		Namibia, Namibian BC Corp	3270af	3289af		
0500	0530		Netherlands, Radio	6165na	9590na		
0500	0600		New Zealand, R New Zealand Int	17675va			
0500	0600		New Zealand, ZLXA	3935do	7290do		
0500	0600	vl	Nigeria, Radio/Enugu	6025do			
0500	0600	vl	Nigeria, Radio/Ibadan	6050do			
0500	0600	vl	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do
0500	0600	vl	Nigeria, Radio/Lagos	3326do	4990do		
0500	0600	vl	Nigeria, Voice of	7255af	15120af		
0500	0504		Pakistan, Radio	15175me	17834me	21465me	
0500	0600	vl	Papua New Guinea, NBC	9675do	11880do		
0500	0600		Russia, Voice of Russia WS	17625au	17665au	21790au	
0500	0600	vl	Rwanda, Radio	6055do			
0500	0530		S Africa, Adventist World Radio	5960af	6015af		
0500	0530		S Africa, Channel Africa	11720af			
0500	0600		S Africa, World Beacon	6115af			
0500	0600		Singapore R Corp of Singapore	6150do			
0500	0600	vl	Solomon Islands, SIBC	5020do	9545do		
0500	0600		Spain, R Exterior Espana	6055na			
0500	0600		Sri Lanka, Sri Lanka BC Corp	6130do			
0500	0600		Swaziland, Trans World Radio	4775af	6100af	9500af	
0500	0530		Switzerland, Swiss R International	9610eu			
0500	0530		Uganda, Radio	4976do	5026do		
0500	0600		UK, BBC World Service	3255af	5975na	6005af	6175am
				6190af	6195eu	7160af	9410eu
				9740as	11760me	11765af	11955pa
				12095eu	15280as	15310as	15360as
				15420af	15575me	17640me	17760as
				17790as	17885af	21660as	
0500	0600		USA, Armed Forces Network	4278am	6458am	12689am	
0500	0600		USA, KAIJ Dallas TX	5755va			
0500	0600		USA, KTBN Salt Lake City UT	7510na			
0500	0600	vl	USA, KVOH Los Angeles CA	9975am			
0500	0600		USA, KWHR Naalehu HI	11565pa	17780as		
0500	0600		USA, Voice of America	5970af	6035af	6080af	7170va
				7195af	11965me	12080af	13670af
				15205va			
0500	0600		USA, WBCQ Monticello ME	7415na	9330na		
0500	0600		USA, WEWN Birmingham AL	5825va			
0500	0600		USA, WGTG McCaysville GA	5085va	6890am		
0500	0600		USA, WHRA Greenbush ME	11565af			
0500	0600		USA, WHRI Noblesville IN	5745na	7315sa		
0500	0600		USA, WJCR Upton KY	7490va	13594as		
0500	0600	mtwhfa	USA, WMLK Bethel PA	9465eu			
0500	0530		USA, WRMI Miami FL	7385na			
0500	0600		USA, WRNO New Orleans LA	7395na			
0500	0600		USA, WSHB Cypress Crk SC	11930eu	9840af		
0500	0600		USA, WTJC Newport NC	9370na			
0500	0600		USA, WWCR Nashville TN	2390na	3210na	5070na	5935na
0500	0600		USA, WYFR Okeechobee FL	5985na	9985eu	11580eu	
0500	0600	vl	Vanuatu, Radio	3945do	4960do	7260do	
0500	0520		Vatican City, Vatican Radio	4005eu	5880eu	7250eu	9660af
				11625af	15570af		
0500	0600		Zambia, Christian Voice	6065do			
0500	0600	vl	Zambia, National BC Corp	6165do	6265do		
0500	0530	vl	Zimbabwe, Zimbabwe BC Corp	4828do	6045do		
0505	0510		Croatia, Croatian Radio	9470au	11970al		
0520	0530		Vatican City, Vatican Radio	9660af	11625af	15570af	
0525	0600	vl	Ghana, Ghana BC Corp	3366do	4915do		
0530	0600		Georgia, Georgian Radio	11805eu			
0530	0600		Thailand, Radio	9655eu	11905eu	15445eu	
0530	0600		UAE, Radio Dubai	13675au	15435au	21700au	
0530	0600	mtwhfa	USA, WRMI Miami FL	7385na			
0530	0600	vl	Zimbabwe, Zimbabwe BC Corp	5975do	6045do		

Selected Programs

Sundays

0500 BBC (am/east af/east as/eu/me/south as/west af): The World Today. See S 0100.
0530 BBC (am): Play of the Week. A different radio drama program each week.
0530 BBC (east af): Art Beat. A new arts program for Africa.
0530 BBC (east as/south as): Reporting Religion. See S 0030.
0530 BBC (eu): Science in Action. See S 0330.
0530 BBC (me): Global Business. See S 0430.
0530 BBC (west af): Art Beat. See S 0530.
0545 BBC (east as): Letter from America. See S 0145.

Monday-Friday

0500 BBC (am/south as): News. See S 1200.
0500 BBC (east af/east as/eu/me/west af): The World Today. See S 0100.
0530 BBC (east af/west af): Network Africa. See M 0330.

Mondays

0505 BBC (am): Meridian Masterpiece. Classical performances.
0505 BBC (south as): One Planet. See M 0305.
0530 BBC (am): Variable Comedy/Quiz Feature. See S 1305.
0530 BBC (south as): People and Places. See M 0330.
0545 BBC (south as): People and Places. See M 0330.

Tuesdays

0505 BBC (am): Meridian Ideas. See M 0205.
0505 BBC (south as): Discovery. See M 1105.
0530 BBC (am): The Music Mix. See M 0230.
0530 BBC (south as): Variable Feature. See S 1105.

Wednesdays

0505 BBC (am): Meridian Screen. See T 0205.
0505 BBC (south as): Health Matters. See M 1105.
0530 BBC (am): The UK Top Twenty. See T 0230.
0530 BBC (south as): Everywoman. See M 1130.

Thursdays

0505 BBC (am): Meridian Music. See W 0205.
0505 BBC (south as): Science Perspective (8th,22nd). See T 1105.
0505 BBC (south as): From Lab to Law (15th). See T 1105.
0505 BBC (south as): Following Trends (29th). See T 1105.
0515 BBC (south as): Seeing Stars (8th). See T 1115.
0515 BBC (south as): Soundbyte (22nd). See T 1115.
0530 BBC (am): Omnibus. See S 0430.
0530 BBC (south as): Focus on Faith. See T 1130.

Fridays

0505 BBC (am): Meridian Writing. See H 0205.
0505 BBC (south as): Sports International. See W 1105.
0530 BBC (am): World Music. See H 1430.
0530 BBC (south as): Pick of the World. See W 1130.

Saturdays

0500 BBC (am/south as): News. See S 1200.
0500 BBC (east af/east as/eu/me/west af): The World Today. See S 0100.
0505 BBC (am): Wright Round the World. See S 1305.
0505 BBC (south as): Wright Round the World. See S 1305.
0530 BBC (east af): This Week and Africa. See A 0330.
0530 BBC (east as): Arts in Action. See S 0030.
0530 BBC (eu/me): Arts in Action. See S 0030.
0530 BBC (west af): Talkabout Africa. See W 1630.

Hauser's Highlights

AUSTRIA: Radio Osterreich Intl
Relay via RCI to WNAm on 17865 shifted an hour earlier to 1500 English, 1530 Spanish (gh)
ORF A-00 in English:

0130-0200	NAm/E, LAm	9655, 9870, 13730
0430-0500	Eu	6155, 13730
0530-0600	NAm/W	6015C
0730-0800	ME	15410, 17870
0830-0900	FE, Au	21650, 21765
1230-1300	Eu, NAm/E	6155, 13730
1500-1530	NAm/W	17865C
1630-1700	Eu, WAf, ME, SAs/SEAs	6155, 13730, 15240, 17765
1830-1900	S/EAf	13730
2130-2200	Eu, N/WAf	6155, 5945, 13730

(via Alokesh Gupta, India, *Electronic DX Press*)

Frequencies

0600	0700		Anguilla, Caribbean Beacon	6090am			
0600	0700	vl	Australia, ABC/Alice Springs	4835do			
0600	0700	vl	Australia, ABC/Katherine	5025do			
0600	0700	vl	Australia, ABC/Tennant Creek	4910do			
0600	0700		Australia, Radio	9660as	12080va	15240pa	15415as
				15515va	17580pa	17750as	21725pa
0600	0700	vl	Botswana, Radio	7255do	9600do	7255do	
0600	0700	vl	Cameroon, RTV/Yaounde	4850do			
0600	0700		Canada, CFRX Toronto ON	6070do			
0600	0700		Canada, CFVP Calgary AB	6030do			
0600	0700		Canada, CHNX Halifax NS	6130do			
0600	0700		Canada, CKZU Vancouver BC	6160do			
0600	0629	mtwhf	Canada, R Canada International	11715af	13755af	15330af	17820af
0600	0700		Costa Rica, R for Peace Intl	6970va	15049al		
0600	0700		Costa Rica, University Network	5030am	6150va	7375na	9725na
				11870va	13749af		
0600	0700		Cuba, Radio Havana	9550na	9820na	9830na	
0600	0700		Ecuador, HCJB	9745na	15115na	15160eu	21455va
0600	0645		Germany, Deutsche Welle	6140eu	13790af	15275af	17860af
0600	0700		Germany, Overcomer Ministries	13810au			
0600	0700	vl	Ghana, Ghana BC Corp	3366do	4915do		
0600	0700		Guyana, Voice of	3289do	5949do		
0600	0700	vl/mtwhf		Italy, IRRS	7120va		
0600	0700		Japan, Radio	5975eu	7230eu	11740as	11840as
				13630na	15230pa	21570pa	
0600	0630		Kenya, Kenya BC Corp	4885do	4915do	4935do	
0600	0700		Kiribati, Radio	9809do	9825do		
0600	0700		Kuwait, Radio	15110as	15230as		
0600	0700	vl	Lesotho, Radio	4800do			
0600	0700	vl	Liberia, ELWA	4760do			
0600	0700	vl	Liberia, R Liberia International	5100do			
0600	0700	vl	Malawi, Malawi BC Corp	3380do	5995do		
0600	0700		Malaysia, Radio	7295do			
0600	0700		Malaysia, RTM Sarawak	7160do			
0600	0700		Malaysia, Voice of	6175as	9750as	15295as	
0600	0630	mtwhfa	Malta, Voice of Mediterranean	7150eu			
0600	0700		Namibia, Namibian BC Corp	3270af	3289af		
0600	0605		New Zealand, R New Zealand Int	17675va			
0600	0700		New Zealand, ZLXA	3935do	7290do		
0600	0700	vl	Nigeria, Radio/Enugu	6025do			
0600	0700	vl	Nigeria, Radio/Ibadan	6050do			
0600	0700	vl	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do
0600	0700	vl	Nigeria, Radio/Lagos	3326do	4990do		
0600	0700	vl	Nigeria, Voice of	7255af	15120af		
0600	0700	vl	Papua New Guinea, NBC	9675do	11880do		
0600	0641		Romania, R Romania International	11940na	15335na		
0600	0700		Russia, Voice of Russia WS	15490au	17625au	17655au	17665au
				21790au			
0600	0630		S Africa, Channel Africa	15215af			
0600	0615		S Africa, Trans World Radio	11640af			
0600	0700		S Africa, World Beacon	6115af			
0600	0700		Sierra Leone, Sierra Leone BS	3316do			
0600	0700		Singapore R Corp of Singapore	6150do			
0600	0700	vl	Solomon Islands, SIBC	5020do	9545do		
0600	0700		Sri Lanka, Sri Lanka BC Corp	6130do			
0600	0700		Swaziland, Trans World Radio	4775af	6100af	9500af	
0600	0700		Uganda, Radio	5026do	7110do	7196do	
0600	0700		UK, BBC World Service	6055af	6175am	6190af	6195eu
				7160af	9410eu	9580va	9740as
				11760me	11765af	11940af	11940af
				11955pa	12095eu	15310as	15360as
				15420af	15485eu	15565as	15575af
				17640af	17760as	17790as	17885af
				21660as			
0600	0700		USA, Armed Forces Network	4278am	6458am	12689am	
0600	0700		USA, KAIJ Dallas TX	5755va			
0600	0700		USA, KTBN Salt Lake City UT	7510na			
0600	0700		USA, KWHR Naalehu HI	11565pa	17780as		
0600	0630		USA, Voice of America	5970af	6035af	6080af	7170va
				7195af	9680af	11805af	11965me
				11995af	12080af	13670af	15205va
0600	0615		USA, WBCQ Monticello ME	7415na			
0600	0615		USA, WBCQ Monticello ME	7415na			
0600	0700		USA, WEWN Birmingham AL	5825va			
0600	0700	twhfa	USA, WGTG McCaysville GA	5085va	6890am		
0600	0700		USA, WHRA Greenbush ME	11565af			
0600	0700		USA, WHRI Noblesville IN	5745na	7315sa		
0600	0700		USA, WJCR Upton KY	7490va	13594as		
0600	0700	mtwhfa	USA, WMLK Bethel PA	9465eu			
0600	0700	twhfa	USA, WRMI Miami FL	7385na			
0600	0700		USA, WRNO New Orleans LA	7395na			
0600	0700		USA, WSHB Cypress Crk SC	13650af			
0600	0700		USA, WTJC Newport NC	9370na			
0600	0700		USA, WWCR Nashville TN	2390na	3210na	5070na	5935na
0600	0700		USA, WYFR Okeechobee FL	5985na	7355eu		
0600	0700	vl	Vanuatu, Radio	3945do	4960do	7260do	
0600	0700		Yemen, Rep of Yemen Radio	9779me			
0600	0700		Zambia, Christian Voice	9865do			
0600	0700	vl	Zambia, National BC Corp	6165do	6265do		
0600	0700	vl	Zimbabwe, Zimbabwe BC Corp	5975do	6045do		
0605	0610		Croatia, Croatian Radio	9470au	11870al		
0615	0630	a	S. Africa, Trans World Radio	11640af			
0615	0700	as	USA, WBCQ Monticello ME	7415na			
0630	0645		Finland, YLE/R Finland	15250va	21670va		
0630	0700	th	Georgia, Georgian Radio	6080eu			
0630	0700		Kenya, Kenya BC Corp	7125do	7150do	7210do	
0630	0700	mtwhfa	UK, BBC World Service	6175am			
0630	0700		USA, Voice of America	7170va	9680af	11805af	11965me
				15205va			
0630	0700	as	USA, Voice of America	5970af	6035af	6080af	7195af
				11995af	12080af	13670af	
0630	0645		Vatican City, Vatican Radio	11625af	13765af	15570af	
0630	0645	mtwhf	Vatican City, Vatican Radio	4005eu	5880eu	7250eu	9645eu
				11740eu	15595eu		
0641	0656		Romania, R Romania International	9570eu	11885na	11940na	15250eu
				15335na			
0645	0700		Germany, Deutsche Welle	6140eu			
0645	0655	as	Germany, Trans World Radio	6045eu			
0645	0655	as	Monaco, Trans World Radio	9870eu			
0655	0700		Germany, Trans World Radio	6045eu			
0655	0700		Monaco, Trans World Radio	9870eu			

Selected Programs

Sundays

0600 BBC (am): Play of the Week (from 0530). See S 0530.
0600 BBC (east af/east as/eu/me/south as/west af): News Briefing. See S 0000.
0620 BBC (east af/east as/eu/me/south as/west af): Sports Roundup. See S 0020.
0630 BBC (am): World Business Report. Latest news from the markets in the Far East, Europe and the USA.
0630 BBC (east af): Assignment. See S 0130.
0630 BBC (east as/south as): Westway Compilation Edition. Catch up on the week's episodes of the World Service's drama serial.
0630 BBC (eu/me/west af): Agenda. See S 0030.

Monday-Friday

0600 BBC (am/eu/south as/west af): News Briefing. See S 0000.
0600 BBC (east af/east as/me): News. See S 1200.
0605 BBC (me): Talking Point. See S 1405.
0630 BBC (am/eu): World Business Report. See S 0630.
0630 BBC (west af): Network Africa. See M 0330.
0645 BBC (east af/me): Off the Shelf. See M 0145.

Mondays

0605 BBC (east af): Talking Point. See S 1405.
0605 BBC (east as): Meridian Masterpiece. See M 0505.
0620 BBC (am/eu/south as/west af): Sports Roundup. See S 0020.
0630 BBC (east as): Variable Comedy/Quiz Feature. See S 1305.
0630 BBC (south as): The Learning Zone. For people who want to learn more about subjects such as science, health, the world and work and literature while practicing English listening skills.
0645 BBC (am): Analysis. Background to current affairs.

Tuesdays

0605 BBC (east af): Outlook. See M 1205.
0605 BBC (east as): Meridian Ideas. See M 0205.
0630 BBC (east as): The Music Mix. See M 0230.
0630 BBC (south as): The Learning Zone. See M 0630.
0645 BBC (am): Analysis. See M 0645.

Wednesdays

0605 BBC (east af): Outlook. See M 1205.
0605 BBC (east as): Meridian Screen. See T 0205.
0630 BBC (east as): The UK Top Twenty. See T 0230.
0630 BBC (south as): The Learning Zone. See M 0630.
0645 BBC (am): From Our Own Correspondent. See S 0230.

Thursdays

0605 BBC (east af): Outlook. See M 1205.
0605 BBC (east as): Meridian Music. See W 0205.
0630 BBC (east as): Omnibus. See S 0430.
0630 BBC (south as): The Learning Zone. See M 0630.
0645 BBC (am): Analysis. See M 0645.

Fridays

0605 BBC (east af): Outlook. See M 1205.
0605 BBC (east as): Meridian Writing. See H 0205.
0630 BBC (east as): Andy Kershaw's World of Music. See H 0230.
0630 BBC (south as): The Learning Zone. See M 0630.
0645 BBC (am): People and Politics. Background to the British political scene.

Saturdays

0600 BBC (am/eu/south as/west af): News Briefing. See S 0000.
0600 BBC (east af/me): News. See S 1200.
0600 BBC (east as): World Briefing. See S 0000.
0605 BBC (me): Outlook. See M 1205.
0620 BBC (am/east as/eu/south as/west af): Sports Roundup. See S 0020.
0630 BBC (am): Agenda. See S 0030.
0630 BBC (east as/eu/south as): People and Politics. See F 0645.
0630 BBC (eu): People and Politics. See F 0645.
0645 BBC (east af/me): Waveguide (24th). See M 0345.
0645 BBC (east af/me): Write On. See M 0345.

FREQUENCIES

0700	0800		Anguilla, Caribbean Beacon	6090am				
0700	0800	vl	Australia, ABC/Alice Springs	4835do				
0700	0800	vl	Australia, ABC/Katherine	5025do				
0700	0800	vl	Australia, ABC/Tennant Creek	4910do				
0700	0800		Australia, Radio	9660pa	12080va	15240pa	15415as	
				17580pa	17750as	21725pa		
0700	0730		Belgium, Radio Vlaanderen Intl	5985am				
0700	0800	vl	Botswana, Radio	7255do	9600do	7255do		
0700	0800	vl	Cameroon, RTV/Yaounde	4850do				
0700	0800		Canada, CFRX Toronto ON	6070do				
0700	0800		Canada, CFVP Calgary AB	6030do				
0700	0800		Canada, CHNX Halifax NS	6130do				
0700	0800		Canada, CKZU Vancouver BC	6160do				
0700	0800		Costa Rica, R for Peace Intl	6970va	15049al			
0700	0800		Costa Rica, University Network	5030am	6150va	7375na	9725na	
				11870va	13749af			
0700	0727		Czech Rep, Radio Prague Intl	9880eu	11600eu			
0700	0800		Ecuador, HCJB	11755pa	15160eu	21455va	21455va	
0700	0800	mtwhf	Eqt Guinea, Radio Africa	15185af				
0700	0800	as/vl	Eqt Guinea, Radio East Africa	15185af				
0700	0800		Germany, Deutsche Welle	6140eu				
0700	0800		Germany, Trans World Radio	6045eu				
0700	0800		Germany, Voice of Hope	5975eu				
0700	0800	vl	Ghana, Ghana BC Corp	3366do	4915do			
0700	0800	vl	Ghana, Ghana BC Corp	3366do	4915do			
0700	0800		Guyana, Voice of	3289do	5949do			
0700	0800	vl/as	Italy, IRRS	7120va				
0700	0800		Kenya, Kenya BC Corp	7125do	7150do	7210do		
0700	0800		Kiribati, Radio	9809do	9825do			
0700	0800		Kuwait, Radio	15110as	15230as			
0700	0800	vl	Lesotho, Radio	4800do				
0700	0800	vl	Liberia, ELWA	4760do				
0700	0800	vl	Liberia, R Liberia International	5100do				
0700	0800	vl	Malawi, Malawi BC Corp	3380do	5995do			
0700	0800		Malaysia, Radio	7295do				
0700	0800		Malaysia, RTM Sarawak	7160do				
0700	0800		Malaysia, Voice of	6275as	9750as	15295as		
0700	0800		Monaco, Trans World Radio	9870eu				
0700	0800		Myanmar, Radio	9730do				
0700	0800		Namibia, Namibian BC Corp	3270af	3289af			
0700	0800		New Zealand, ZLXA	3935do	7290do			
0700	0800	vl	Nigeria, Radio/Enugu	6025do				
0700	0800	vl	Nigeria, Radio/Ibadan	6050do				
0700	0800	vl	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do	
0700	0800	vl	Nigeria, Radio/Lagos	3326do	4990do			
0700	0800		Palau, KHBN/Voice of Hope	9965as	9985as	15725as		
0700	0730	vl	Papua New Guinea, NBC	4890do	9675do			
0700	0756		Romania, R Romania International	15580af	17735af			
0700	0800		Russia, Voice of Russia WS	15490au	17495au	17625au	17655au	
				21790au				
0700	0800		Sierra Leone, Sierra Leone BS	3316do				
0700	0800		Singapore R Corp of Singapore	6150do				
0700	0730		Slovakia, R Slovakia International	9440au	15460au	17550au		
0700	0800	vl	Solomon Islands, SIBC	5020do	9545do			
0700	0800		Sri Lanka, Sri Lanka BC Corp	6130do				
0700	0720		Swaziland, Trans World Radio	4775af	6100af	9500af		
0700	0800		Taiwan, R Taiwan International	5950na				
0700	0800		Uganda, Radio	5026do	7110do	7196do		
0700	0730	as	UK, BBC World Service	17885af				
0700	0730	mtwhfa	UK, BBC World Service	6190af				
0700	0800		UK, BBC World Service	6190af	9580va	9740as	11760me	
				11765af	11940af	11955pa	12095eu	
				15310as	15360as	15400af	15485eu	
				15565eu	17640eu	17760as	17790as	
				17830af	21660as			
0700	0800		USA, Armed Forces Network	4278am	6458am	12689am		
0700	0800		USA, KAIJ Dallas TX	5755va				
0700	0800		USA, KTBN Salt Lake City UT	7510na				
0700	0800		USA, KWHR Naalehu HI	11565pa	17780as			
0700	0730	a	USA, Voice of America	6873va				
0700	0800		USA, WBCQ Monticello ME	7415na				
0700	0800		USA, WEWN Birmingham AL	5825va				
0700	0800		USA, WHRA Greenbush ME	11565af				
0700	0800		USA, WHRI Noblesville IN	5745na	7315sa			
0700	0800		USA, WJCR Upton KY	7490va	13594as			
0700	0800	mtwhfa	USA, WMLK Bethel PA	9465eu				
0700	0800		USA, WRNO New Orleans LA	7395na				
0700	0800		USA, WSHB Cypress Crk SC	13650af				
0700	0800		USA, WTJC Newport NC	9370na				
0700	0800		USA, WWCR Nashville TN	2390na	3210na	5070na	5935na	
0700	0745		USA, WYFR Okeechobee FL	7355eu	13695va	15170eu		
0700	0800	vl	Vanuatu, Radio	3945do	4960do	7260do		
0700	0800		Zambia, Christian Voice	9865do				
0700	0800	vl	Zambia, National BC Corp	6165do	6265do			
0700	0800	vl	Zimbabwe, Zimbabwe BC Corp	5975do	6045do			
0705	0710		Croatia, Croatian Radio	13820	au			
0705	0800	as	New Zealand, R New Zealand Int	17675va				
0706	0800		New Zealand, R New Zealand Int	11720va				
0730	0800		Austria, R Austria International	15410me	17870me			
0730	0800		Georgia, Georgian Radio	11910eu				
0730	0740	as	Guam, Trans World Radio	15200as				
0730	0800	vl/mtwhfa	Papua New Guinea, NBC	4890do				
0730	0800		Switzerland, Swiss R International	15545af	17685af	21750af		
0730	0800	as	UK, BBC World Service	15575as	17885af			
0740	0800		Guam, Trans World Radio	15200as				

0800	0900		Anguilla, Caribbean Beacon	6090am				
0800	0830	vl	Australia, ABC/Alice Springs	4835do				
0800	0830	vl	Australia, ABC/Katherine	5025do				
0800	0830	vl	Australia, ABC/Tennant Creek	4910do				
0800	0830		Australia, Radio	5995pa	9710pa	12080va	13605pa	
				15240va	21725pa			
0800	0900	vl	Botswana, Radio	7255do	9600do	7255do		
0800	0900	vl	Cameroon, RTV/Yaounde	4850do				
0800	0900		Canada, CFRX Toronto ON	6070do				
0800	0900		Canada, CFVP Calgary AB	6030do				
0800	0900		Canada, CHNX Halifax NS	6130do				
0800	0900		Canada, CKZU Vancouver BC	6160do				
0800	0900		Costa Rica, R for Peace Intl	6970va	15049al			
0800	0900		Costa Rica, University Network	5030am	6150va	7375na	9725na	
				11870va	13749af			
0800	0900		Ecuador, HCJB	11755pa	15150eu	21455va		
0800	0900	mtwhf	Eqt Guinea, Radio Africa	15185af				
0800	0900	as/vl	Eqt Guinea, Radio East Africa	15185af				
0800	0900	a	Finland, YLE/R Finland	9560eu				
0800	0900		Germany, Deutsche Welle	6140eu				
0800	0900		Germany, Overcomer Ministries	13810au				
0800	0820		Germany, Trans World Radio	6045eu				
0800	0900		Germany, Voice of Hope	5975eu				
0800	0900	vl	Ghana, Ghana BC Corp	3366do	4915do			
0800	0900	as	Guam, Trans World Radio	15200as	15330as			
0800	0900		Guyana, Voice of	3289do	5949do			
0800	0900		Indonesia, Voice of	9525va	11784va	15149va		
0800	0900	vl/as	Italy, IRRS	7120va				
0800	0900		Kenya, Kenya BC Corp	7125do	7150do	7210do		
0800	0900		Kiribati, Radio	9809do	9825do			
0800	0900	vl	Lesotho, Radio	4800do				
0800	0900	vl	Liberia, ELWA	4760do				
0800	0900	vl	Liberia, R Liberia International	5100do				
0800	0810	vl	Malawi, Malawi BC Corp	3380do	5995do			
0800	0900		Malaysia, Radio	7295do				
0800	0825		Malaysia, Voice of	6275as	9750as	15295as		
0800	0900	s	Malta, Voice of Mediterranean	11770eu				
0800	0820		Monaco, Trans World Radio	9870eu				
0800	0830		Myanmar, Radio	9730do				
0800	0900		Namibia, Namibian BC Corp	7165af	7215af			
0800	0900		New Zealand, R New Zealand Int	11720va				
0800	0900		New Zealand, ZLXA	3935do	7290do			
0800	0900	vl	Nigeria, Radio/Enugu	6025do				
0800	0900	vl	Nigeria, Radio/Ibadan	6050do				
0800	0900	vl	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do	
0800	0900	vl	Nigeria, Radio/Lagos	3326do	4990do			
0800	0900		Palau, KHBN/Voice of Hope	9955as	9965as	9985as	15725as	
0800	0900	vl	Papua New Guinea, NBC	4890do				
0800	0900		Russia, Voice of Russia WS	15490au	17495au	17625au	17665au	
				21790au				
0800	0900	s	S Africa, Amateur Radio League	9750af	21560af			
0800	0900		Sierra Leone, Sierra Leone BS	3316do				
0800	0900		Singapore R Corp of Singapore	6150do				
0800	0900	vl	Solomon Islands, SIBC	5020do				
0800	0900		South Korea, R Korea Intl	9570au	13670eu			
0800	0900		Sri Lanka, Sri Lanka BC Corp	6130do				
0800	0900		Uganda, Radio	5026do	7110do	7196do		
0800	0900		UK, BBC World Service	6190af	9740as	11940af	11955pa	
				12095eu	15360as	15400af	15485eu	
				15565eu	17640eu	17760as	17830af	
				21660as				
0800	0900	as	UK, BBC World Service	15310as	17885af	21830va		
0800	0900		USA, Armed Forces Network	4278am	6458am	12689am		
0800	0900		USA, KAIJ Dallas TX	5755va				
0800	0900		USA, KNLS Anchor Point AK	11765as				
0800	0900		USA, KTBN Salt Lake City UT	7510na				
0800	0900		USA, KWHR Naalehu HI	11565pa	17780as			
0800	0900		USA, Voice of America	11775as	13610as	15150as		
0800	0900		USA, WEWN Birmingham AL	5825va				
0800	0900		USA, WHRA Greenbush ME	11565af				
0800	0900		USA, WHRI Noblesville IN	5745na	7315sa			
0800	0900		USA, WJCR Upton KY	7490va	13594as			
0800	0900		USA, WRNO New Orleans LA	7395na				
0800	0900		USA, WSHB Cypress Crk SC	9845au	9860eu			
0800	0900		USA, WTJC Newport NC	9370na				
0800	0900		USA, WWCR Nashville TN	2390na	3210na	5070na	5935na	
0800	0900	vl	Vanuatu, Radio	3945do	4960do	7260do		
0800	0900		Zambia, Christian Voice	9865do				
0800	0900	vl	Zambia, National BC Corp	6165do	6265do			
0800	0900	vl	Zimbabwe, Zimbabwe BC Corp	5975do	6045do			
0804	0820		Pakistan, Radio	17834eu	21465eu			
0805	0810		Croatia, Croatian Radio	13820au				
0815	0900	f	Seychelles, FEBA Radio	15460as				
0820	0850	s	Germany, Trans World Radio	6045eu				
0820	0850	s	Monaco, Trans World Radio	9870eu				
0830	0900	vl	Australia, ABC/Alice Springs	2310do				
0830	0900	vl	Australia, ABC/Katherine	2485do				
0830	0900	vl	Australia, ABC/Tennant Creek	2325do				
0830	0900		Australia, Radio	5995pa	9710pa	12080va	13605pa	
				15415as	15240va	17750as	21725pa	
0830	0900	a	Austria, R Austria International	21650as	21765au			
0830	0900		Georgia, Georgian Radio	11910me				
0830	0900		Switzerland, Swiss R International	9885au	13685au			
0840	0900	s	Armenia, Voice of	4810eu	15270eu			

0900 UTC

5:00 AM EDT
4:00 AM CDT
2:00 AM PDT

6:00 AM EDT
5:00 AM CDT
3:00 AM PDT

1000 UTC

FREQUENCIES

0900	1000		Anguilla, Caribbean Beacon	6090am			
0900	1000	vl	Australia, ABC/Alice Springs	2310do			
0900	1000	vl	Australia, ABC/Katherine	2485do			
0900	1000	vl	Australia, ABC/Tennant Creek	2325do			
0900	1000		Australia, Radio	11880as	13605pa	17750as	21820as
0900	1000	vl	Botswana, Radio	7255do	9600do	7255do	
0900	1000	vl	Cameroon, RTV/Yaounde	4850do			
0900	1000		Canada, CFRX Toronto ON	6070do			
0900	1000		Canada, CFVP Calgary AB	6030do			
0900	1000		Canada, CHNX Halifax NS	6130do			
0900	1000		Canada, CKZU Vancouver BC	6160do			
0900	0956		China, China Radio International	11730pa	15210pa		
0900	1000		Costa Rica, R for Peace Intl	6970va	15049al		
0900	1000		Costa Rica, University Network	5030am	6150va	7375na	9725na
				11870va	13749af		
0900	0929		Czech Rep, Radio Prague Intl	21745va			
0900	1000		Ecuador, HCJB	11775pa	21455va		
0900	1000	mtwhf	Eqt Guinea, Radio Africa	15185af			
0900	1000	as/vl	Eqt Guinea, Radio East Africa	15185af			
0900	0945		Germany, Deutsche Welle	6140eu	6160pa	9565af	15105as
				15210af	15410af	15470as	17560as
				17800af	21560as	21680as	21790af
0900	1000	s	Germany, Good News World R	13740au			
0900	1000	a	Germany, Good News World R	5985eu	5995eu		
0900	1000		Germany, Voice of Hope	5975eu			
0900	0915	vl	Ghana, Ghana BC Corp	3366do	4915do		
0900	0915		Guam, Trans World Radio	15200as	15330as		
0900	1000		Guyana, Voice of	3289do	5949do		
0900	1000	vl/as	Italy, IRRS	7120va			
0900	1000		Kenya, Kenya BC Corp	7125do	7150do	7210do	
0900	0930		Kiribati, Radio	9809do	9825do		
0900	1000	vl	Lesotho, Radio	4800do			
0900	1000	vl	Liberia, ELWA	4760do			
0900	1000	vl	Liberia, R Liberia International	6100do			
0900	1000		Malaysia, Radio	7295do			
0900	1000		Namibia, Namibian BC Corp	7165af	7215af		
0900	1000		New Zealand, R New Zealand Int	11720va			
0900	1000		New Zealand, ZLXA	3935do	7290do		
0900	1000	vl	Nigeria, Radio/Enugu	6025do			
0900	1000	vl	Nigeria, Radio/Ibadan	6050do			
0900	1000	vl	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do
0900	1000	vl	Nigeria, Radio/Lagos	3326do	4990do		
0900	1000		Palau, KHBN/Voice of Hope	9955as	9965as	9985as	15725as
0900	1000	vl	Papua New Guinea, NBC	4890do			
0900	1000		Sierra Leone, Sierra Leone BS	3316do			
0900	1000		Singapore R Corp of Singapore	6150do			
0900	1000	vl	Solomon Islands, SIBC	5020do			
0900	1000		Sri Lanka, Sri Lanka BC Corp	6130do			
0900	1000		Uganda, Radio	5026do	7110do	7196do	
0900	0930		UK, BBC World Service	6190af	6195va	9605as	9740as
				11760me	11765as	11940af	11945af
				11955pa	12095eu	15190sa	15310as
				15360as	15400af	15485eu	15565eu
				15575as	17640eu	17760as	17790as
				17830af	17885af	21470af	21660as
0900	0930	mtwhfa	UK, BBC World Service	11945as			
0900	1000		UK, Merlin Network One	6130eu			
0900	1000		USA, Armed Forces Network	4278am	6458am	12689am	
0900	1000		USA, KAIJ Dallas TX	5755va			
0900	1000		USA, KTBN Salt Lake City UT	7510na			
0900	1000		USA, KWHR Naalehu HI	11565pa	17780as		
0900	1000		USA, Voice of America	11775as	13610as	15150as	
0900	1000		USA, WEWN Birmingham AL	5825va			
0900	1000		USA, WHRA Greenbush ME	11565af			
0900	1000		USA, WHRI Noblesville IN	5745na	7315sa		
0900	1000		USA, WJCR Upton KY	7490va	13594as		
0900	1000		USA, WRNO New Orleans LA	7395na			
0900	1000		USA, WSHB Cypress Crk SC	9455sa	9860eu		
0900	1000		USA, WTJC Newport NC	9370na			
0900	1000		USA, WWCR Nashville TN	2390na	5070na	5935na	7435na
0900	1000	vl	Vanuatu, Radio	3945do	4960do	7260do	
0900	1000		Zambia, Christian Voice	9865do			
0900	1000	vl	Zambia, National BC Corp	6165do	6265do		
0900	1000	vl	Zimbabwe, Zimbabwe BC Corp	5975do	6045do		
0915	1000	vl	Ghana, Ghana BC Corp	6130do	4915do		
0915	1000	vl/as	Ghana, Ghana BC Corp	4915do	4915do		
0915	0930		Guam, Trans World Radio	15330as			
0915	1000	mtwhf	USA, WRMI Miami FL	9955am			
0930	1000		Guam, Trans World Radio	9865as			
0930	1000		Lithuania, Radio Vilnius	9710eu			
0930	1000		Netherlands, Radio	9795as	12065as	13710as	
0930	1000		UK, BBC World Service	6190af	6195as	9740as	11760me
				11940af	11945as	11955pa	12095eu
				15190sa	15310as	15400af	15485eu
				15565eu	15575as	17640eu	17760as
				17790as	17830af	17885af	21470af
				21660as			
0945	1000		Germany, Deutsche Welle	6140eu			

1000	1100		Anguilla, Caribbean Beacon	11775am			
1000	1100	vl	Australia, ABC/Alice Springs	2310do			
1000	1100	vl	Australia, ABC/Katherine	2485do			
1000	1100	vl	Australia, ABC/Tennant Creek	2325do			
1000	1100		Australia, Radio	11880as	13605pa	17750as	21820as
1000	1100	as	Bhutan, Bhutan BC Service	6035do			
1000	1100	vl	Botswana, Radio	7255do	9600do	7255do	
1000	1100	vl	Cameroon, RTV/Yaounde	4850do			
1000	1100		Canada, CFRX Toronto ON	6070do			
1000	1100		Canada, CFVP Calgary AB	6030do			
1000	1100		Canada, CHNX Halifax NS	6130do			
1000	1100		Canada, CKZN St John's NF	6160do			
1000	1100		Canada, CKZU Vancouver BC	6160do			
1000	1056		China, China Radio International	11730pa	15210pa		
1000	1100		Costa Rica, R for Peace Intl	6970va	15049al		
1000	1100		Costa Rica, University Network	5030am	6150va	7375na	9725na
				11870va	13749af		
1000	1100		Ecuador, HCJB	11755pa	21455va		
1000	1100	mtwhf	Eqt Guinea, Radio Africa	15185af			
1000	1100	as/vl	Eqt Guinea, Radio East Africa	15185af			
1000	1100		Germany, Deutsche Welle	6140eu			
1000	1100		Germany, Voice of Hope	5975eu			
1000	1100	vl	Ghana, Ghana BC Corp	6130do	4915do		
1000	1100	vl/as	Ghana, Ghana BC Corp	4915do	4915do		
1000	1100		Guam, Trans World Radio	9865as			
1000	1100		Guyana, Voice of	5949do			
1000	1100		India, All India Radio	11585as	13700au	15020as	17485au
				17840as	17895au		
1000	1100	vl/as	Italy, IRRS	7120va			
1000	1100		Japan, Radio	9695as	15590as	21570pa	
1000	1100		Jordan, Radio	17680eu			
1000	1100		Kenya, Kenya BC Corp	7125do	7150do	7210do	
1000	1100	vl	Lesotho, Radio	4800do			
1000	1100	vl	Liberia, ELWA	4760do			
1000	1100	vl	Liberia, R Liberia International	6100do			
1000	1100		Malaysia, Radio	7295do			
1000	1100		N Marianas, KHBI Saipan	11840as			
1000	1100		Namibia, Namibian BC Corp	7165af	7215af		
1000	1030		Netherlands, Radio	9795as	12065as	13710as	
1000	1100		New Zealand, R New Zealand Int	11720va			
1000	1100		New Zealand, ZLXA	3935do			
1000	1100	vl	Nigeria, Radio/Enugu	6025do			
1000	1100	vl	Nigeria, Radio/Ibadan	6050do			
1000	1100	vl	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do
1000	1100	vl	Nigeria, Radio/Lagos	4990do	7285do		
1000	1100	vl	Nigeria, Voice of	7255af	15120af		
1000	1100		Palau, KHBN/Voice of Hope	9955as	9965as	9985as	15725as
1000	1100	vl	Papua New Guinea, NBC	4890do			
1000	1100		Seirra Leone, Sierra Leone BS	5980do			
1000	1100		Singapore R Corp of Singapore	6150do			
1000	1100	vl	Solomon Islands, SIBC	5020do			
1000	1030		Sri Lanka, Sri Lanka BC Corp	4940do			
1000	1030		Switzerland, Swiss R International	15315eu			
1000	1100		Uganda, Radio	5026do	7110do	7196do	
1000	1100		UK, BBC World Service	5965na	6190af	6195va	9740as
				11760me	11940af	11955pa	12095eu
				15310as	15360as	15485eu	15565eu
				15575as	17640eu	17760as	17790as
				17885af	21470af	21660as	
1000	1100	as	UK, BBC World Service	15190sa	15400af	17830af	
1000	1030		UK, RTE Radio	11740au			
1000	1100		USA, Armed Forces Network	4278am	6458am	12689am	
1000	1100		USA, KAIJ Dallas TX	5755va			
1000	1100		USA, KTBN Salt Lake City UT	7510na			
1000	1100		USA, KWHR Naalehu HI	9930as	11565pa		
1000	1100		USA, Voice of America	6160as	9645as	9760as	9770pa
				15160as	15240as	15425as	
1000	1100		USA, WEWN Birmingham AL	7425na	15745eu		
1000	1100		USA, WHRI Noblesville IN	6040na	9495sa		
1000	1100		USA, WJCR Upton KY	7490va	13594as		
1000	1100	mtwhfa	USA, WRMI Miami FL	9955am			
1000	1100		USA, WRNO New Orleans LA	7395na			
1000	1100		USA, WSHB Cypress Crk SC	6095am	9455sa		
1000	1100		USA, WTJC Newport NC	9370na			
1000	1100		USA, WWCR Nashville TN	2390na	5070na	5935na	9475na
1000	1100		USA, WYFR Okeechobee FL	5950na			
1000	1100	vl	Vanuatu, Radio	3945do	4960do	7260do	
1000	1027		Vietnam, Voice of	9839as	12019as		
1000	1100		Zambia, Christian Voice	9865do			
1000	1100	vl	Zambia, National BC Corp	6165do	6265do		
1000	1100	vl	Zimbabwe, Zimbabwe BC Corp	5975do	6045do		
1015	1030	mtwhf	Vatican City, Vatican Radio	5880eu	9645eu	11740eu	15595eu
				21850eu			
1030	1057		Czech Rep, Radio Prague Intl	9880eu	11615eu		
1030	1045	mtwhf	Ethiopia, Radio	5990do	7110do	9704do	
1030	1100		Guam, Adventist World Radio	11795as			
1030	1100		Israel, Kol Israel	15650va	17535va		
1030	1100		Malaysia, RTM Sarawak	7160do			
1030	1100		Mongolia, Voice of	12085	au		
1030	1100		Netherlands, Radio	6045eu	9795as	9860eu	12065as
				13710as			
1030	1100		South Korea, R Korea Intl	11715na			
1030	1100		Sri Lanka, Sri Lanka BC Corp	4940do	11835as	15120as	17850as
1030	1100		UAE, Radio Dubai	13675eu	15370eu	15395eu	21605eu

Frequencies

1100	1200		Anguilla, Caribbean Beacon	11775am			
1100	1200	vl	Australia, ABC/Alice Springs	2310do			
1100	1200	vl	Australia, ABC/Katherine	2485do			
1100	1200	vl	Australia, ABC/Tennant Creek	2325do			
1100	1200		Australia, Radio 5995pa	6020pa	9580va	13605pa	21820as
1100	1200	vl	Botswana, Radio	7255do	9600do	7255do	
1100	1200		Bulgaria, Radio	15700eu	17500eu		
1100	1200	vl	Cameroon, RTV/Yaounde	4850do			
1100	1200		Canada, CBC Northern Service	9625do			
1100	1200		Canada, CFRX Toronto ON	6070do			
1100	1200		Canada, CFVP Calgary AB	6030do			
1100	1200		Canada, CHNX Halifax NS	6130do			
1100	1200		Canada, CKZN St John's NF	6160do			
1100	1200		Canada, CKZU Vancouver BC	6160do			
1100	1200	mtwhf	Canada, R Canada International	9640na	13650na	17765na	17820na
1100	1200		Costa Rica, R for Peace Intl	6970va	15049al		
1100	1200		Costa Rica, University Network	5030am	6150va	7375na	9725na
				11870va	13749af		
1100	1200		Ecuador, HCJB	12005am	15115am	21455va	
1100	1200	mtwhf	Eqt Guinea, Radio Africa	15185af			
1100	1200	as/vl	Eqt Guinea, Radio East Africa	15185af			
1100	1145		Germany, Deutsche Welle	6140eu	11785af	15410af	17680af
				17860af			
1100	1200		Germany, Overcomer Ministries	5850eu			
1100	1200	vl	Ghana, Ghana BC Corp	6130do	4915do		
1100	1200	vl/as	Ghana, Ghana BC Corp	4915do	4915do		
1100	1200		Guyana, Voice of	5949do			
1100	1200		Iran, VOIRI	15385as	15430as	15585as	21470as
				21730as			
1100	1200	vl/as	Italy, IRRS	7120va			
1100	1200		Japan, Radio	6120na	9695as	15590as	
1100	1200		Jordan, Radio	17680eu			
1100	1120	fa	Kazakhstan, Radio Almaty	11840eu			
1100	1200		Kenya, Kenya BC Corp	7125do	7150do	7210do	
1100	1200	vl	Lesotho, Radio	4800do			
1100	1200	vl	Liberia, ELWA	4760do			
1100	1200	vl	Liberia, R Liberia International	6100do			
1100	1200		Malaysia, Radio	7295do			
1100	1200		Malaysia, TRM Sarawak	7160do			
1100	1125		Moldova Radio Moldova Intl	11580am			
1100	1200		N Marianas, KHBI Saipan	11840as			
1100	1200		Namibia, Namibian BC Corp	7165af	7215af		
1100	1130		Netherlands, Radio 6045eu	9795as	9860eu	12065as	13710as
1100	1200		New Zealand, R New Zealand Int	11720va			
1100	1200		New Zealand, ZLXA	3935do			
1100	1200	vl	Nigeria, Radio/Enugu	6025do			
1100	1200	vl	Nigeria, Radio/Ibadan	6050do			
1100	1200	vl	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do
1100	1200	vl	Nigeria, Radio/Lagos	4990do	7285do		
1100	1104		Pakistan, Radio	7110do	17834eu	21465eu	
1100	1200		Palau, KHBN/Voice of Hope	9955as	9965as	9985as	13840as
1100	1200	vl	Papua New Guinea, NBC	4890do			
1100	1200		Sierra Leone, Sierra Leone BS	5980do			
1100	1200		Singapore, R Singapore Intl	6150as	9590as		
1100	1130	vl	Solomon Islands, SIBC	5020do			
1100	1130		Sri Lanka, Sri Lanka BC Corp	4940do	11835as	15210as	17850as
1100	1200		Switzerland, Swiss R International	13735as	21770as		
1100	1200		Taiwan, Voice of Asia	7445as			
1100	1200		Uganda, Radio	5026do	7110do	7196do	
1100	1130	mtwhf	UK, BBC Caribbean Report	6195ca	15220ca		
1100	1130	as	UK, BBC World Service 5965na	6195as	9580as	9740as	11760me
			11955as	12095eu	15280as	15220am	15310as
			15400af	15485eu	15565eu	15575as	17640as
			17700as	17790sa	17830af	17885af	21470af
1100	1130	as	UK, BBC World Service	6195na	15190sa	15220am	
1100	1200	mtwhfa	UK, BBC World Service	6190af	11940af		
1100	1200	a	UK, Virgin Radio/Merlin	21455me	21515af		
1100	1200		Ukraine, R Ukraine International	21520au			
1100	1200		USA, Armee Forces Network	4278am	6458am	12689am	
1100	1200		USA, KAIJ Dallas TX	5755va			
1100	1200		USA, KTBN Salt Lake City UT	7510na			
1100	1200		USA, KWHR Naalehu HI	9930as	11565as		
1100	1130	mtwhf	USA, Voice of America 13675af	15550af	17650af	17780af	21600af
1100	1130	mtwhf	USA, Voice of America 13675af	15550af	17650af	17780af	21600af
1100	1200		USA, Voice of America	6160as	9645as	9760as	9770pa
				15160as	15240as	15425as	
1100	1200		USA, WEWN Birmingham AL	7425na	15745eu		
1100	1200		USA, WHRI Noblesville IN	6040na	9495sa		
1100	1200		USA, WJCR Upton KY	7490va	13594as		
1100	1130	mtwhfa	USA, WRMI Miami FL	9955am			
1100	1200		USA, WRNO New Orleans LA	7395na			
1100	1200		USA, WSHB Cypress Crk SC	6095am	11660am		
1100	1200		USA, WTJC Newport NC	9370na			
1100	1200		USA, WWCR Nashville TN	5070na	5935na	7435na	15685na
1100	1200		USA, WYFR Okeechobee FL	5850na	5950na		
1100	1200	vl/s	Vanuatu, Radio	3945do	4960do	7260do	
1100	1127		Vietnam, Voice of	7285as			
1100	1200		Zambia, Christian Voice	9865do			
1100	1200	vl	Zambia, National BC Corp	6165do	6265do		
1100	1200	vl	Zimbabwe, Zimbabwe BC Corp	5975do	6045do		
1115	1145		Nepal, Radio	5005as	7165as		
1120	1140	w	Kzaakhstan, Radio Almaty	9620eu	11840eu		
1130	1200		Belgium, Radio Vlaanderen Intl	9865as	9925eu		
1130	1157		Czech Rep, Radio Prague Intl	6055eu	21745as		
1130	1145	vl	Libya, Voice of Africa	11815af	15415af	15435va	
1130	1200		Netherlands, Radio	6045eu	9860eu		
1130	1200		Sri Lanka, Sri Lanka BC Corp	4940do			
1130	1200		Sweden, Radio	18960na			
1130	1200		USA, WRMI Miami FL	9955am			
1130	1200	f	Vatican City, Vatican Radio	15595va	17515va		
1140	1200	t	Kzaakhstan, Radio Almaty	9620eu	11840eu		
1145	1200		Germany, Deutsche Welle	6140eu			

Selected Programs

Sundays

1101 BBC (south as): Concert Hall. Classical music concerts.
1105 BBC (east af): Variable Feature. Special features and new series.
1120 BBC (am/east af/east as/eu/me/west af): British News. Ten min.
1130 BBC (am): Arts in Action. See S 0030.
1130 BBC (east af/eu/me): Arts in Action. See S 0030.
1130 BBC (east as): Play of the Week. See S 0530.
1130 BBC (west af): Postmark Africa. See S 0330.

Monday-Friday

1105 BBC (carib): BBC Caribbean Report Morning Edition. Current affairs with emphasis on political and economic analysis.
1110 BBC (carib): Sports Caribbean. The latest scores and sports news.
1115 BBC (carib): Caribbean Magazine. General news and features.
1120 BBC (am/eu/south as/west af): British News. See S 1120.
1145 BBC (am/eu/south as/west af): Sports Roundup. See S 0020.

Mondays

1105 BBC (east af): Discovery. In-depth look at scientific research.
1105 BBC (east as): Health Matters. New developments on keeping fit.
1105 BBC (me): Meridian Masterpiece. See M 0505.
1130 BBC (am/south as/eu): Letter from America. See S 0145.
1130 BBC (east af): Variable Feature. See S 1105.
1130 BBC (east as): Everywoman. Features and reports worldwide.
1130 BBC (me): Variable Comedy/Quiz Feature. See S 1305.
1130 BBC (west af): Inside Track. See S 0030.

Tuesdays

1105 BBC (east af): Health Matters. See M 1105.
1105 BBC (east as): Science (6th,20th). Richard Hollingham,Alun Lewis.
1105 BBC (east as): From Lab to Law (13th). Science policy.
1105 BBC (east as): Following Trends (27th). A science round table.
1105 BBC (me): Meridian Ideas. See M 0205.
1115 BBC (east as): Seeing Stars (6th). Heather Couper and Nigel Henbest
1115 BBC (east as): Soundbyte (20th). Computer and infor technology.
1130 BBC (am/eu/south as/west af): Analysis. See M 0645.
1130 BBC (east af): Everywoman. See M 1130.
1130 BBC (east as): Focus on Faith. Alison Hilliard talks to church leaders.
1130 BBC (me): The Music Mix. See M 0230.

Wednesdays

1105 BBC (east af): Science Perspective (7th,21st). See T 1105.
1105 BBC (east af): Snapshots (14th). Scientific and technological endeavor in a particular region.
1105 BBC (east af): Following Trends (28th). See T 1105.
1105 BBC (east as): Sports International. Live features.
1105 BBC (me): Meridian Screen. See T 0205.
1115 BBC (east af): Seeing Stars (7th). See T 1115.
1115 BBC (east af): Soundbyte (21st). See T 1115.
1130 BBC (am/eu/south as/west af): Analysis. See M 0645.
1130 BBC (east af): Focus on Faith. See T 1130.
1130 BBC (east as): Pick of the World. Daire Brehan celebrates the diversity and range of the whole of BBC World Service output.
1130 BBC (me): The UK Top Twenty.

Thursdays

1105 BBC (east af): Sports International. See W 1105.
1105 BBC (east as): One Planet. See M 0305.
1105 BBC (me): Meridian Music. See W 0205.
1130 BBC (am/eu/south as/west af): From Our Own Correspondent.
1130 BBC (east af): Pick of the World. See W 1130.
1130 BBC (east as): People and Places. See M 0330.
1130 BBC (me): Omnibus. See S 0430.

Fridays

1105 BBC (east af): One Planet. See M 0305.
1105 BBC (east as): Discovery. See M 1105.
1105 BBC (me): Meridian Writing. See H 0205.
1130 BBC (am/eu/south as/west af): Analysis. See M 0645.
1130 BBC (east af): People and Places. See M 0330.
1130 BBC (east as): Variable Feature. See S 1105.
1130 BBC (me): Andy Kershaw's World of Music. See H 0230.

Saturdays

1100 BBC (am/eu/west af): News Briefing. See S 0000.
1100 BBC (east af): News Summary. See S 1100.
1100 BBC (east as): World Briefing. See S 0000.
1100 BBC (me/south as): News. See S 1200.
1105 BBC (east af): Westway Compilation Edition. See S 0630.
1105 BBC (me): Wright Round the World. See S 1305.
1105 BBC (south as): The Edge (hour 2).
1120 BBC (am/east as/eu/west af): British News. See S 1120.
1130 BBC (am): Analysis. See M 0645.
1130 BBC (east af/eu/west af): The Greenfield Collection. See S 2330.
1130 BBC (east as): Science in Action. See S 0330.
1145 BBC (eu/west af): Sports Roundup. See S 0020.

Frequencies

1200	1300		Anguilla, Caribbean Beacon	11775am				
1200	1300	vl	Australia, ABC/Alice Springs	2310do				
1200	1300	vl	Australia, ABC/Katherine	2485do				
1200	1300	vl	Australia, ABC/Tennant Creek	2325do				
1200	1300		Australia, Radio	5995pa	6020pa	9580va	11650pa	21820as
1200	1300	mtwhf	Bhutan, Bhutan BC Service	5030do				
1200	1300	vl	Botswana, Radio	7255do	9600do	7255do		
1200	1300		Brazil, Radio Nacional Bras	15445am				
1200	1300	vl	Cameroon, RTV/Yaounde	4850do				
1200	1300	vl	Canada, CBC Northern Service	9625do				
1200	1300		Canada, CFRX Toronto ON	6070do				
1200	1300		Canada, CFVP Calgary AB	6030do				
1200	1300		Canada, CHNX Halifax NS	6130do				
1200	1300		Canada, CKZN St John's NF	6160do				
1200	1300		Canada, CKZU Vancouver BC	6160do				
1200	1230		Canada, R Canada International	9640na	9660as	13650na	15195as	17765na 17820na
1200	1256		China, China Radio International	9715as	9760pa	11675pa	11980as	15415as
1200	1300		Costa Rica, R for Peace Intl	6970va	15049al			
1200	1300		Costa Rica, University Network	5030am	6150va	7375na	9725na	11870va 13749af
1200	1300		Ecuador, HCJB	12005am	15115am	21455va		
1200	1300	as/vl	Eqt Guinea, Radio East Africa	15185af				
1200	1300		France, R France International	11670eu	15155eu	15195af	15540af	
1200	1300		Germany, Deutsche Welle	6140eu				
1200	1300		Germany, Overcomer Ministries	5850eu				
1200	1300	vl	Ghana, Ghana BC Corp	4915do	6130do			
1200	1300		Guyana, Voice of	5949do				
1200	1230		Iran, VOIRI	15385as	15430as	15585as	21470as	21730as
1200	1300	vl/as	Italy, IRRS	7120va				
1200	1300		Jordan, Radio	11690eu				
1200	1300		Kenya, Kenya BC Corp	7125do	7150do	7210do		
1200	1300	vl	Lesotho, Radio	4800do				
1200	1300	vl	Liberia, ELWA	4760do				
1200	1300	vl	Liberia, R Liberia International	6100do				
1200	1300		Malaysia, Radio	7295do				
1200	1300		N Marianas, KHBI Saipan	11550as				
1200	1300		Namibia, Namibian BC Corp	7165af	7215af			
1200	1230		Netherlands, Radio	6045eu	9860eu			
1200	1205		New Zealand, R New Zealand Int	11720va				
1200	1300	occsnal	New Zealand, R New Zealand Int	6100va				
1200	1300		New Zealand, ZLXA	3935do				
1200	1300	vl	Nigeria, Radio/Enugu	6025do				
1200	1300	vl	Nigeria, Radio/Ibadan	6050do				
1200	1300	vl	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do	
1200	1300	vl	Nigeria, Radio/Lagos	4990do	7285do			
1200	1256		North Korea, R Pyongyang	3560va	9640va	9850va	9975va	11335va 13650va
1200	1300		Palau, KHBN/Voice of Hope	9955as	9965as	9985as	13840as	
1200	1300	vl/mtwhfa		Papua New Guinea, NBC			4890do	9675do
1200	1255		Poland, Radio Polonia	6095eu	7270eu	9525eu	11820eu	
1200	1300		Sierra Leone, Sierra Leone BS	5980do				
1200	1300		Singapore, R Singapore Intl	6150as	9590as			
1200	1300	vl	Solomon Islands, SIBC	5020do				
1200	1230		Sri Lanka, Sri Lanka BC Corp	4940do				
1200	1230		Switzerland, Swiss R International	15315eu				
1200	1300		Taiwan, R Taiwan International	7130as	9610au			
1200	1300		Uganda, Radio	5026do	7110do	7196do		
1200	1220	as	UK, BBC World Service	6195na	15220am			
1200	1300		UK, BBC World Service	5965na	6190af	6195as	9515na	9580as 9740as 11760me 11940af 11955as 12095eu 15280as 15310as 15485eu 15565eu 15575me 17640eu 17700as 17830af 17885af 21470af
1200	1300	a	UK, Virgin Radio/Merlin	21455me	21515af			
1200	1300		USA, Armed Forces Network	4278am	6458am	12689am		
1200	1300		USA, KAIJ Dallas TX	13815va				
1200	1300		USA, KTBN Salt Lake City UT	7510na				
1200	1300		USA, KWHR Naalehu HI	9930as	11565pa			
1200	1300		USA, Voice of America	6160as	9645as	9760as	15160as	15240as 15425as
1200	1300		USA, WEWN Birmingham AL	7425na	15745eu			
1200	1300	mtwhf	USA, WGTG McCaysville GA	9400va	12172am			
1200	1300		USA, WHRI Noblesville IN	6040na	9495sa			
1200	1300		USA, WJCR Upton KY	7490va	13594as			
1200	1300		USA, WRMI Miami FL	9955am				
1200	1300		USA, WRNO New Orleans LA	7395na				
1200	1300		USA, WSHB Cypress Crk SC	6095am	11660am			
1200	1300		USA, WTJC Newport NC	9370na				
1200	1300		USA, WWCR Nashville TN	5070na	7435na	13845na	15685na	
1200	1245		USA, WYFR Okeechobee FL	5850na	5950na	17750na		
1200	1230		Uzbekistan, Radio Tashkent	7285as	9715as	15295as	17775as	
1200	1300	vl/s	Vauatu, Radio	3945do	4960do	7260do		
1200	1300		Zambia, Christian Voice	9865do				
1200	1300	vl	Zambia, National BC Corp	6165do	6265do			
1200	1300	vl	Zimbabwe, Zimbabwe BC Corp	5975do	6045do			
1204	1220	mtwhf	UK, BBC Caribbean Report	6195ca	15220ca			
1206	1300	occsnal	New Zealand, R New Zealand Int	6100va				
1215	1300		Egypt, Radio Cairo	17595as				
1220	1300	mtwhf	UK, BBC World Service	15220am				
1230	1300		Austria, R Austria International	6155eu	13730va			
1230	1300		Bangladesh, Bangla Betar	7184as	9558as			
1230	1259		Canada, R Canada International	9640na	13650na	17765na	17820na	
1230	1300		Guam, Adventist World Radio	15330va				
1230	1300		Italy, Adventist World Radio	9610eu				
1230	1300		Sri Lanka, Sri Lanka BC Corp	4940do	6005as	6075as	9735as	15425as
1230	1300		Sweden, Radio	18960na	21810am			
1230	1300		Thailand, Radio	9655as	9885as	11905as		
1230	1300		Turkey, Voice of	17830as	21540eu			
1230	1300	a	UK, Wales Radio Intl/Merlin	17650au				
1230	1257		Vietnam, Voice of	9839as	12019as			
1245	1300	a	Seychelles, FEBA Radio	15535me				

Selected Programs

Sundays

1200 BBC (am/east af/me/south as/west af): Newshour. A comprehensive look at the major topics of the day, plus up-to-the-minute international and British news.
1200 BBC (east as): Play of the Week (from 1130). See S 0530.
1200 BBC (eu): News. A five-minute news summary.
1201 VOA Washington DC (News Now): World News.
1205 BBC (eu): John Peel. Tracks from newly released albums and singles from the contemporary music scene.
1206 VOA Washington DC (News Now): World News in Depth.
1210 VOA Washington DC (News Now): Regional News.
1214 VOA Washington DC (News Now): USA News.
1218 VOA Washington DC (News Now): Sports.
1222 VOA Washington DC (News Now): Features.
1228 VOA Washington DC (News Now): Station Break.
1230 BBC (eu): Global Business. See S 0430.
1230 VOA Washington DC (News Now): Preview.
1231 VOA Washington DC (News Now): World News.
1233 VOA Washington DC (News Now): Encounter.
1258 VOA Washington DC (News Now): Station Break.

Monday-Friday

1200 BBC (am/me/south as/west af): Newshour. See S 1200.
1200 BBC (east af/east as/eu): News. See S 1200.
1201 VOA Washington DC (News Now): World News.
1205 BBC (east af/east as/eu): Outlook. An up-to-the-minute mix of conversation, controversy and color from around the world.
1206 VOA Washington DC (News Now): World News in Depth.
1210 BBC (carib): BBC Caribbean Report Morning Edition. See M 1105.
1210 VOA Washington DC (News Now): Regional News.
1214 VOA Washington DC (News Now): USA News.
1218 VOA Washington DC (News Now): Sports.
1222 VOA Washington DC (News Now): Features.
1228 VOA Washington DC (News Now): Station Break.
1230 VOA Washington DC (News Now): Preview.
1231 VOA Washington DC (News Now): World News in Depth.
1245 VOA Washington DC (News Now): Science/Medicine/Environment.
1249 VOA Washington DC (News Now): Business and Economic News.
1253 VOA Washington DC (News Now): Music Feature.
1258 VOA Washington DC (News Now): Station Break.

Mondays

1230 BBC (east af/eu): Plain English. The workings of the English language.
1245 BBC (east as): Patterns of Faith. Though-provoking and illuminating refections on a wide range of issues.

Tuesdays

1230 BBC (east af/eu): Heart and Soul. The complementary strand to patterns of faith.
1245 BBC (east as): Plain English. See M 1230.

Wednesdays

1230 BBC (east af/eu): Best of the Edge. A 15-minute replay of pop music.
1245 BBC (east as): Heart and Soul. See T 1230.

Thursdays

1230 BBC (east af/eu): Body and Mind. See T 0330.
1245 BBC (east as): Best of the Edge. See W 1230.

Fridays

1230 BBC (east af/eu): Patterns of Faith. See M 1245.
1245 BBC (east as): Body and Mind. See T 0330.

Saturdays

1200 BBC (am/east af/me/south as/west af): Newshour. See S 1200.
1200 BBC (east as/eu): News. See S 1200.
1201 VOA Washington DC (News Now): World News.
1205 BBC (east as): Variable Comedy/Quiz Feature. See S 1305.
1205 BBC (eu): Wright Round the World. See S 1305.
1206 VOA Washington DC (News Now): World News in Depth.
1210 VOA Washington DC (News Now): Regional News.
1214 VOA Washington DC (News Now): USA News.
1218 VOA Washington DC (News Now): Sports.
1222 VOA Washington DC (News Now): Features.
1228 VOA Washington DC (News Now): Station Break.
1230 VOA Washington DC (News Now): World News.
1233 VOA Washington DC (News Now): Press Conference USA.
1258 VOA Washington DC (News Now): Station Break.

Frequencies

1300	1400		Anguilla, Caribbean Beacon	11775am				
1300	1400	vl	Australia, ABC/Alice Springs	2310do				
1300	1400	vl	Australia, ABC/Katherine	2485do				
1300	1400	vl	Australia, ABC/Tennant Creek	2325do				
1300	1400		Australia, Radio	5995pa	6020pa	9580va	11650pa	21820as
1300	1400	vl	Botswana, Radio	7255do	9600do	7255do		
1300	1320		Brazil, Radio Nacional Bras	15445am				
1300	1400	vl	Cameroon, RTV/Yaounde	4850do				
1300	1400	vl	Canada, CBC Northern Service	9625do				
1300	1400		Canada, CFRX Toronto ON	6070do				
1300	1400		Canada, CFVP Calgary AB	6030do				
1300	1400		Canada, CHNX Halifax NS	6130do				
1300	1400		Canada, CKZN St John's NF	6160do				
1300	1400		Canada, CKZU Vancouver BC	6160do				
1300	1330		Canada, R Canada International	13650na				
1300	1330	mtwhf	Canada, R Canada International	9640na	17765na	17820na		
1300	1356		China, China Radio International	7405na	9570na	11675pa	11900pa	11980as 15180as
1300	1400		Costa Rica, R for Peace Intl	15049va	25930al			
1300	1400		Costa Rica, University Network	5030am	6150va	7375na	9725na	11870va 13749af
1300	1329		Czech Rep, Radio Prague Intl	13580eu	17485as			
1300	1400		Ecuador, HCJB	12005am	15115am	21455va		
1300	1330		Egypt, Radio Cairo	17595as				
1300	1400	as/vl	Eqt Guinea, Radio East Africa	15185af				
1300	1400		Germany, Deutsche Welle	6140eu				
1300	1400	s	Germany, Good News World R	15330as				
1300	1400		Germany, Overcomer Ministries	5850eu	13810eu			
1300	1330	s	Germany, Universal Life	9710eu	9955na			
1300	1400	vl	Ghana, Ghana BC Corp	4915do	6130do			
1300	1400		Guyana, Voice of	5949do				
1300	1400	vl/as	Italy, IRRS	7120va				
1300	1400		Jordan, Radio	11690eu				
1300	1330		Kenya, Kenya BC Corp	7125do	7150do	7210do		
1300	1400		Lebanon, Voice of Hope	11530va				
1300	1400	vl	Lesotho, Radio	4800do				
1300	1400	vl	Liberia, ELWA	4760do				
1300	1400	vl	Liberia, R Liberia International	6100do				
1300	1400		Malaysia, Radio	7295do				
1300	1400		N Marianas, KHBI Saipan	9940as				
1300	1400		Namibia, Namibian BC Corp	7165af	7215af			
1300	1400	occsnal	New Zealand, R New Zealand Int	6100va				
1300	1400		New Zealand, ZLXA	3935do				
1300	1400	vl	Nigeria, Radio/Enugu	6025do				
1300	1400	vl	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do	
1300	1400	vl	Nigeria, Radio/Lagos	4990do	7285do			
1300	1400		Palau, KHBN/Voice of Hope	9955as	9965as	9985as	13840as	
1300	1400	vl/mtwhfa		Papua New Guinea, NBC			4890do	9675do
1300	1356		Romania, R Romania International	15250na	15390na	17770eu	17790na	
1300	1400	as	S Africa, Channel Africa	11720af	17780af	21725af		
1300	1400		Sierra Leone, Sierra Leone BS	5980do				
1300	1400		Singapore, R Singapore Intl	6150as	9590as			
1300	1400	vl	Solomon Islands, SIBC	5020do				
1300	1400		South Korea, R Korea Intl	9570as	9640om	13670as		
1300	1400		Sri Lanka, Sri Lanka BC Corp	4940do	6005as	6075as	9735as	15425as
1300	1330		Turkey, Voice of	17830as	21540eu			
1300	1400		Uganda, Radio	4976do	5026do			
1300	1400		UK, BBC World Service	5965na	5990as	6190af	6195va	9515na 9740as 11760me 11865na 11940af 12095eu 15220am 15310as 15420af 15485eu 15565eu 15575me 17640eu 17700as 17830af 17885af 21470af
1300	1400	a	UK, Global Kitchen/Merlin	9750eu	12005eu	15235eu		
1300	1400	a	UK, Virgin Radio/Merlin	21455me	21515af			
1300	1400		USA, Armed Forces Network	4278am	6458am	12689am		
1300	1400		USA, KAIJ Dallas TX	13815va				
1300	1400		USA, KJES Vado NM	11715na				
1300	1400		USA, KNLS Anchor Point AK	9615as				
1300	1400		USA, KTBN Salt Lake City UT	7510na				
1300	1400		USA, KWHR Naalehu HI	9930as	11565pa			
1300	1400		USA, Voice of America	6160as	9645as	9760as	15160as	15425as
1300	1400		USA, WEWN Birmingham AL	11875na	15745eu			
1300	1400	mtwhf	USA, WGTG McCaysville GA	9400va	12172am			
1300	1400		USA, WHRI Noblesville IN	6040na	15105sa			
1300	1400		USA, WJCR Upton KY	7490va	13594as			
1300	1315	smtwhf	USA, WRMI Miami FL	9955am				
1300	1400		USA, WRNO New Orleans LA	7395na				
1300	1400		USA, WSHB Cypress Crk SC	9430am	9455na			
1300	1400		USA, WTJC Newport NC	9370na				
1300	1400		USA, WWCR Nashville TN	9475na	12160na	13845na	15685na	
1300	1400		USA, WYFR Okeechobee FL	11550as	11830na	11970na	17750na	
1300	1400		Zambia, Christian Voice	9865do				
1300	1400	vl	Zambia, National BC Corp	6165do	6265do			
1300	1400	vl	Zimbabwe, Zimbabwe BC Corp	5975do	6045do			
1315	1400	s	USA, WRMI Miami FL	9955am				
1325	1400		Germany, Voice of Hope	15715as	17550af			
1330	1400		Australia, Radio	5995pa	6020pa	9475as	9580va	11650pa 21820as
1330	1400		Canada, R Canada International	9535as	11795as	13650na		
1330	1400	mtwhf	Canada, R Canada International	9640na	17765na	17820na		
1330	1400		Guam, Adventist World Radio	11705as	11750as			
1330	1400		India, All India Radio	9710as	11620as	13710as		
1330	1400		Kenya, Kenya BC Corp	4885do	4915do	4935do		
1330	1400		Sweden, Radio	17900as				
1330	1400		UAE, Radio Dubai	13675eu	15395eu	21605eu		
1330	1400		Uzbekistan, Radio Tashkent	7285as	9715as	15295as	17775as	
1330	1357		Vietnam, Voice of	7145eu	9730eu			
1345	1400		Vatican City, Vatican Radio	17515au	21620au			

Selected Programs

Sundays

1300 BBC (am/east af/me/south as): News. See S 1200.
1300 BBC (east as/eu): Newshour. See S 1200.
1300 BBC (west af): News Summary. See S 1100.
1305 BBC (east af): Concert Hall. See S 1101.
1305 BBC (am): Jazzmatazz. The request program that lives up to its title.
1305 BBC (me): Variable Comedy/Quiz Feature. These programs are panel quizes and other light entertainment in a format heard in America decades ago.
1305 BBC (south as): Wright Round the World. Steve Wright's brand new show with listeners' requests and dedications.
1305 BBC (west af): Concert Hall. See S 1101.
1330 BBC (am): In Praise of God. See S 0130.
1330 BBC (me): Global Business. See S 0430.

Monday-Friday

1300 BBC (am/east af/eu/me/south as/west af): News. See S 1200.
1300 BBC (east as): Newshour. See S 1200.
1305 BBC (am/south as): Outlook. See M 1205.
1345 BBC (am): Off the Shelf. See M 0145.
1350 BBC (east as): World Business Report. See S 0630.

Mondays

1305 BBC (east af/eu/west af): Meridian Masterpiece. See M 0505.
1305 BBC (me): Discovery. See M 1105.
1330 BBC (east af/west af): Variable Comedy/Quiz Feature. See S 1305.
1330 BBC (eu): Variable Comedy/Quiz Feature. See S 1305.
1330 BBC (me): Variable Feature. See S 1105.
1330 BBC (south as): Patterns of Faith. See M 1245.

Tuesdays

1305 BBC (east af/eu/west af): Meridian Ideas. See M 0205.
1305 BBC (me): Health Matters. See M 1105.
1330 BBC (east af): The Music Mix. See M 0230.
1330 BBC (eu): The Music Mix. See M 0230.
1330 BBC (me): Everywoman. See M 1130.
1330 BBC (south as): Plain English. See M 1230.
1330 BBC (west af): The Music Mix. See M 0230.

Wednesdays

1305 BBC (east af/eu/west af): Meridian Screen. See T 0205.
1305 BBC (me): Science Perspective (7th,21st). See T 1105.
1305 BBC (me): Snapshots (14th). See W 1105.
1305 BBC (me): Following Trends (28th). See T 1105.
1315 BBC (me): Seeing Stars (7th). See T 1115.
1315 BBC (me): Soundbyte (21st). See T 1115.
1330 BBC (east af/eu): The UK Top Twenty. See T 0230.
1330 BBC (me): Focus on Faith. See T 1130.
1330 BBC (south as): Heart and Soul. See T 1230.
1330 BBC (west af): The UK Top Twenty. See T 0230.

Thursdays

1305 BBC (east af/eu/west af): Meridian Music. See W 0205.
1305 BBC (me): Sports International. See W 1105.
1330 BBC (east af/eu): Omnibus. See S 0430.
1330 BBC (me): Pick of the World. See W 1130.
1330 BBC (south as): Best of the Edge. See W 1230.
1330 BBC (west af): Omnibus. See S 0430.

Fridays

1305 BBC (east af/eu/west af): Meridian Writing. See H 0205.
1305 BBC (me): One Planet. See M 0305.
1330 BBC (east af/eu): World Music. See H 1430.
1330 BBC (me): People and Places. See M 0330.
1330 BBC (south as): Body and Mind. See T 0330.
1330 BBC (west af): World Music. See H 1430.
1345 BBC (me): People and Places. See M 0330.

Saturdays

1300 BBC (am/east af/me/south as/west af): News. See S 1200.
1300 BBC (east as/eu): Newshour. See S 1200.
1305 BBC (am): Global Business. See S 0430.
1305 BBC (east af): Jazzmatazz. See S 1305.
1305 BBC (me): Jazzmatazz. See S 1305.
1305 BBC (south as): Variable Comedy/Quiz Feature. See S 1305.
1330 BBC (am/east af/me): People and Politics. See F 0645.
1330 BBC (south as): The Greenfield Collection. See S 2330.

Frequencies

1400	1500		Anguilla, Caribbean Beacon	11775am			
1400	1500	vl	Australia, ABC/Alice Springs	2310do			
1400	1500	vl	Australia, ABC/Katherine	2485do			
1400	1500	vl	Australia, ABC/Tennant Creek	2325do			
1400	1500		Australia, Radio	5995as	9475as	9590va	11650pa
1400	1500	vl	Botswana, Radio	7255do	9600do	7255do	
1400	1500	vl	Cameroon, RTV/Yaounde	4850do			
1400	1500	vl	Canada, CBC Northern Service	9625do			
1400	1500		Canada, CFRX Toronto ON	6070do			
1400	1500		Canada, CFVP Calgary AB	6030do			
1400	1500		Canada, CHNX Halifax NS	6130do			
1400	1500		Canada, CKZN St John's NF	6160do			
1400	1500		Canada, CKZU Vancouver BC	6160do			
1400	1500	s	Canada, R Canada International	13650na	17800na		
1400	1456		China, China Radio International	7405na	9700as	11675as	11825as
				13685af	15110as	15125af	
1400	1500		Costa Rica, R for Peace Intl	15049va	25930al		
1400	1500		Costa Rica, University Network	5030am	6150va	7375na	9725na
				11870va	13749af		
1400	1500		Ecuador, HCJB	12005am	15115am	21455va	
1400	1500	as/vl	Eqt Guinea, Radio East Africa	15185af			
1400	1500		France, R France International	11610as	17620va	17680as	
1400	1500		Germany, Deutsche Welle	6140eu			
1400	1500		Germany, Overcomer Ministries	5850eu	13810eu		
1400	1500		Germany, RTE Radio	15625eu			
1400	1500		Germany, Voice of Hope	15715as	17550af		
1400	1500	vl	Ghana, Ghana BC Corp	4915do	6130do		
1400	1500		Guyana, Voice of	5949do			
1400	1500		India, All India Radio	9710as	11620as	13710as	
1400	1430		Israel, Kol Israel	15650va	17535va		
1400	1500	vl/as	Italy, IRRS	7120va			
1400	1500		Japan, Radio	9505na	9860as	11730as	11880me
1400	1500		Jordan, Radio	11690eu			
1400	1500		Kenya, Kenya BC Corp	4885do	4915do	4935do	
1400	1500		Lebanon, Voice of Hope	11530va			
1400	1500	vl	Lesotho, Radio	4800do			
1400	1500	vl	Liberia, ELWA	4760do			
1400	1500	vl	Liberia, R Liberia International	6100do			
1400	1500		Malaysia, Radio	7295do			
1400	1500		Malaysia, RTM Sarawak	7160do			
1400	1430		Mexico, R Mexico International	5985am	9705am		
1400	1500		Namibia, Namibian BC Corp	7165af	7215af		
1400	1500	occsnal	New Zealand, R New Zealand Int	6100va			
1400	1500		New Zealand, ZLXA	3935do			
1400	1500	vl	Nigeria, Radio/Enugu	6025do			
1400	1500	vl	Nigeria, Radio/Ibadan	6050do			
1400	1500	vl	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do
1400	1500	vl	Nigeria, Radio/Lagos	4990do	7285do		
1400	1500		Oman, Radio Sultanate of	15140va			
1400	1500		Palau, KHBN/Voice of Hope	9955as	9965as	9985as	13840as
1400	1500	vl/mtwhfa	Papua New Guinea, NBC	4890do	9675do		
1400	1500		Russia, Voice of Russia WS	11695as	12025as	12055me	
1400	1455	as	S Africa, Channel Africa	11720af	17780af	21725af	
1400	1500		Sierra Leone, Sierra Leone BS	5980do			
1400	1500		Singapore R Corp of Singapore	6150do			
1400	1430	vl	Solomon Islands, SIBC	5020do			
1400	1500		Sri Lanka, Sri Lanka BC Corp	4940do	6005as	6075as	9735as
				15425as			
1400	1500		Switzerland, Swiss R International	9575as	17670as		
1400	1500		Taiwan, R Taiwan International	15125as			
1400	1430		Thailand, Radio	9655as	9830as	11905as	
1400	1500		Uganda, Radio	4976do	5026do		
1400	1500		UK, BBC World Service	5990as	6190af	6195as	9515na
				9740as	11865na	11940af	12095eu
				15220na	15310as	15485eu	15565eu
				15575me	17640eu	17700as	17830af
				17840am	21470af	21660af	
1400	1500	a	UK, Global Kitchen/Merlin	9750eu	12005eu	15235eu	
1400	1500	a	UK, Virgin Radio/Merlin	21455me	21515af		
1400	1500		USA, Armed Forces Network	4278am	6458am	12689am	
1400	1500		USA, KAIJ Dallas TX	13815va			
1400	1500		USA, KJES Vado NM	11715na			
1400	1500		USA, KTBN Salt Lake City UT	7510na			
1400	1500		USA, KWHR Naalehu HI	9930as	11565as		
1400	1430	s	USA, Voice of America	18275va			
1400	1500		USA, Voice of America	6160as	7125as	9645as	9760as
				15160as	15255va	15425as	
1400	1500		USA, WEWN Birmingham AL	11875na	15745eu		
1400	1500		USA, WGTG McCaysville GA	12172am			
1400	1500	mtwhf	USA, WGTG McCaysville GA	9400va			
1400	1500		USA, WHRI Noblesville IN	6040na	15105sa		
1400	1500		USA, WJCR Upton KY	7490va	13594as		
1400	1500	s	USA, WRMI Miami FL	9955am			
1400	1500		USA, WRNO New Orleans LA	7395na			
1400	1500		USA, WTJC Newport NC	9370na			
1400	1500		USA, WWCR Nashville TN	9475na	12160na	13845na	15685na
1400	1500		USA, WYFR Okeechobee FL	11550as	11830na	11970na	17750na
1400	1405		Vatican City, Vatican Radio	17515au	21620au		
1400	1500		Zambia, Christian Voice	9865do			
1400	1500	vl	Zambia, National BC Corp	6165do	6265do		
1400	1500	vl	Zimbabwe, Zimbabwe BC Corp	5975do	6045do		
1415	1420		Nepal, Radio	5005as	7165as		
1430	1500		Australia, Radio	5995as	9475as	9580va	11650pa
				11660as			
1430	1500		Guam, Adventist World Radio	9355as			
1430	1500		Guam, Trans World Radio	15330as			
1430	1500		Malaysia, RTM Kota Kinabalu	5980do			
1430	1500		Myanmar, Radio	5985do			
1430	1500		Netherlands, Radio	9890as	12065as	15590as	
1430	1500		Slovakia, Adventist World Radio	17525as			
1430	1500		Sweden, Radio	18960na			

Selected Programs

Sundays

1400 BBC (am/east af/east as/eu/me/south as/west af): News. See S 1200.
1405 BBC (am/east af/east as/eu/me/south as/west af): Talking Point. Robin Lustig and Diana Madill host this regular phone-in program which encourages strong opinions about key issues.

Monday-Friday

1400 BBC (east as): East Asia Today. Current affairs, politics and finance.
1400 BBC (am/eu/south as/west af): News. See S 1200.
1400 BBC (east af/me): News Briefing. See S 0000.
1420 BBC (east af/me): World Business Report. See S 0630.
1430 BBC (east af/east as/me): British News. See S 1120.
1445 BBC (east af/east as/me): Sports Roundup. See S 0020.

Mondays

1405 BBC (am/south as): Meridian Ideas. See M 0205.
1405 BBC (eu/west af): Discovery. See M 1105.
1430 BBC (am): The Music Mix. See M 0230.
1430 BBC (eu/west af): Variable Feature. See S 1105.
1430 BBC (south as): The Music Mix. See M 0230.

Tuesdays

1405 BBC (am/south as): Meridian Screen. See T 0205.
1405 BBC (eu/west af): Health Matters. See M 1105.
1430 BBC (am): The UK Top Twenty. See T 0230.
1430 BBC (eu/west af): Everywoman. See M 1130.
1430 BBC (south as): The UK Top Twenty. See T 0230.

Wednesdays

1405 BBC (am/south as): Meridian Music. See W 0205.
1405 BBC (eu/west af): Science Perspective (7th,21st). See T 1105.
1405 BBC (eu/west af): Snapshots (14th). See W 1105.
1405 BBC (eu/west af): Following Trends (28th). See T 1105.
1415 BBC (eu/west af): Seeing Stars (7th). See T 1115.
1415 BBC (eu/west af): Soundbyte (21st). See T 1115.
1430 BBC (am/south as): The UK Album Chart. See W 0245.
1430 BBC (eu/west af): Focus on Faith. See T 1130.

Thursdays

1405 BBC (am/south as): Meridian Writing. See H 0205.
1405 BBC (eu/west af): Sports International. See W 1105.
1430 BBC (am): World Music. The best of folk, non-western classical and non-western popular music.
1430 BBC (eu/south as): Pick of the World. See W 1130.

Fridays

1405 BBC (am/south as): Meridian Masterpiece. See M 0505.
1405 BBC (eu/west af): One Planet. See M 0305.
1430 BBC (am/south as): Music X-Press. See F 0230.
1430 BBC (eu): People and Places. See M 0330.
1445 BBC (east af): Football Extra. A review of the week's action and the upcoming weekend matches.
1445 BBC (west af): People and Places. See M 0330.

Saturdays

1400 BBC (am/east af/east as/eu/me/south as/west af): News. See S 1200.
1405 BBC (am/east af/east as/eu/me/south as): Sportsworld. The weekly sports magazine.
1405 BBC (west af): Jazzmatazz. See S 1305.
1430 BBC (west af): Arts in Action. See S 0030.

Hauser's Highlights

MALI: CRI

Assignments for CRI via Bamako for A00:
7170 0830-0900, 2300-0000
9890 1730-1830
11735 1930-2130
11970 1700-1730
11975 2130-0000
13640 2000-2130
13650 1300-1600
13685 1700-1930
15125 1400-1730
15500 1930-2300
15530 1630-1930
15550 1730-1930
17880 1300-1400, 1600-1700
(Bob Padula, *Electronic DX Press*)

Frequencies

1500	1515		Afghanistan, Voice of Shari'ah	7002do	7073do			
1500	1600		Anguilla, Caribbean Beacon	11775am				
1500	1600	vl	Australia, ABC/Alice Springs	2310do				
1500	1600	vl	Australia, ABC/Katherine	2485do				
1500	1600	vl	Australia, ABC/Tennant Creek	2325do				
1500	1600		Australia, Radio	5995as	9475as	9580va	11650pa	
				11660as			0	
1500	1530		Austria, R Austria International	17865na				
1500	1600	vl	Botswana, Radio	7255do	9600do	7255do		
1500	1600	vl	Cameroon, RTV/Yaounde	4850do				
1500	1600	vl	Canada, CBC Northern Service	9625do				
1500	1600		Canada, CFRX Toronto ON	6070do				
1500	1600		Canada, CFVP Calgary AB	6030do				
1500	1600		Canada, CHNX Halifax NS	6130do				
1500	1600		Canada, CKZN St John's NF	6160do				
1500	1600		Canada, CKZU Vancouver BC	6160do				
1500	1559	s	Canada, R Canada International	13650na	17800na			
1500	1556		China, China Radio International	7160as	7405na	9785as	13685af	
				15125af				
1500	1600		Costa Rica, R for Peace Intl	15049va	25930al			
1500	1600		Costa Rica, University Network	5030am	6150va	7375na	9725na	
				11870va	13749af			
1500	1530		Ecuador, HCJB	12055am	15115am	21455va		
1500	1600	as/vl	Eqt Guinea, Radio East Africa	15185af				
1500	1600		Germany, Deutsche Welle	6140eu				
1500	1600		Germany, Overcomer Ministries	5850eu				
1500	1600		Germany, Voice of Hope	15715as	17550af			
1500	1600	vl	Ghana, Ghana BC Corp	4915do	6130do			
1500	1600		Guam, Trans World Radio	15330as				
1500	1600		Guyana, Voice of	5949do				
1500	1600		Japan, Radio	9750as	9860as	11730as		
1500	1600		Jordan, Radio	11690eu				
1500	1600		Kenya, Kenya BC Corp	4885do	4915do	4935do		
1500	1600		Lebanon, Voice of Hope	11530va				
1500	1600	vl	Lesotho, Radio	4800do				
1500	1600	vl	Liberia, ELWA	4760do				
1500	1600	vl	Liberia, R Liberia International	6100do				
1500	1600		Malaysia, Radio	7295do				
1500	1600		Malaysia, RTM Kota Kinabalu	5980do				
1500	1600		Malaysia, RTM Sarawak	7160do				
1500	1530	twhfa	Mexico, R Mexico International	5985am	9705am			
1500	1530		Mongolia, Voice of	12015as	12085as			
1500	1600		Myanmar, Radio	5985do				
1500	1600		Namibia, Namibian BC Corp	7165af	7215af			
1500	1600		Netherlands, Radio	9890as	12065as	15590as		
1500	1505	occsnal	New Zealand, R New Zealand Int	6100va				
1500	1600		New Zealand, ZLXA	3935do				
1500	1600	vl	Nigeria, Radio/Enugu	6025do				
1500	1600	vl	Nigeria, Radio/Ibadan	6050do				
1500	1600	vl	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do	
1500	1600	vl	Nigeria, Radio/Lagos	4990do	7285do			
1500	1600	vl	Nigeria, Voice of	7255af	15120af			
1500	1556		North Korea, R Pyongyang	4405va	6574na	9335na	11710na	
								13760na
1500	1600		Palau, KHBN/Voice of Hope	9955as	9965as	9985as	13840as	
1500	1600	vl/mtwhfa		Papua New Guinea, NBC			4890do	
				9675do				
1500	1600		Russia, Voice of Russia WS	4940me	4965me	4975me	7325me	
				9730eu	11500as	12015me		
1500	1530		S Africa, Channel Africa	17770af				
1500	1600		Seychelles, FEBA Radio	11600as				
1500	1600		Sierra Leone, Sierra Leone BS	5980do				
1500	1600		Singapore R Corp of Singapore	6150do				
1500	1600		Sri Lanka, Sri Lanka BC Corp	4940do	6005as	6075as	9735as	
				15425as				
1500	1600		Uganda, Radio	4976do	5026do			
1500	1600		UK, BBC World Service	5975as	5990as	6190af	6195as	
				9515na	9740as	11860af	11865na	
				11940af	12095eu	15220na	15310as	
				15400af	15420af	15485eu	15575eu	
				17700as	17830af	17840am	21470af	
				21490af	21660af			
1500	1600	a	UK, Global Kitchen/Merlin	9750eu	11785eu	15235eu		
1500	1600	a	UK, Virgin Radio/Merlin	21455me	21515af			
1500	1600		USA, Armed Forces Network	4278am	6458am	12689am		
1500	1600		USA, KAIJ Dallas TX	13815va				
1500	1600		USA, KTBN Salt Lake City UT	15590na				
1500	1600		USA, KWHR Naalehu HI	9930as	11565pa			
1500	1600		USA, VOA Special English	6160as	9760as	9845as	12040as	
				15235as				
1500	1600		USA, Voice of America	7125as	9645as	9700me	9780as	
				15205va	15255va			
1500	1600		USA, WEWN Birmingham AL	11875na	15745eu			
1500	1600		USA, WGTG McCaysville GA	12172am				
1500	1600	mtwhf	USA, WGTG McCaysville GA	9400va				
1500	1600		USA, WHRA Greenbush ME	17650af				
1500	1600		USA, WHRI Noblesville IN	13760na	15105sa			
1500	1600		USA, WJCR Upton KY	7490va	13594as			
1500	1600	s	USA, WRMI Miami FL	9955am				
1500	1600		USA, WRNO New Orleans LA	7395na	15420al			
1500	1600		USA, WTJC Newport NC	9370na				
1500	1600		USA, WWCR Nashville TN	9475na	12160na	13845na	15685na	
1500	1600		USA, WYFR Okeechobee FL	11830na	17750na			
1500	1600		Zambia, Christian Voice	9865do				
1500	1600	vl	Zambia, National BC Corp	6165do	6265do			
1500	1600	vl	Zimbabwe, Zimbabwe BC Corp	5975do	6045do			
1506	1600	occsnal	New Zealand, R New Zealand Int	6145va				
1515	1600	vl	Malawi, Malawi BC Corp	3380do				
1530	1545		Bangladesh, Bangla Betar	4882as	15520as			
1530	1600	vl	Botswana, Radio	3356do	4820do	7255do		
1530	1600		Ecuador, HCJB	12005am	15115am			
1530	1600		Georgia, Georgian Radio	6180me				
1530	1600		Iran, VOIRI	7115as	9635as	11775na		
1545	1600	sh	Bangladesh, Bangla Betar	4882as	15520as			
1550	1600		Vatican City, Vatican Radio	12065au	13765au	17730au		

Selected Programs

Sundays

1500 BBC (am/east af/east as): News. See S 1200.
1500 BBC (eu/me/south as/west af): News Summary. See S 1100.
1501 BBC (me): Concert Hall. See S 1101.
1501 BBC (south as): Play of the Week. See S 0530.
1505 BBC (am/eu): Concert Hall. See S 1101.
1505 BBC (east af/west af): Play of the Week. See S 0530.
1505 BBC (east as): The Alternative. A time spot for a changeable music program such as John Peel or Steve Lamacq.

Monday-Friday

1500 BBC (am/east af/east as/me/west af): News. See S 1200.
1500 BBC (eu/south as): News Briefing. See S 0000.
1505 BBC (east af/west af): Focus on Africa. Up-to-the-minute reports on the day's events from all over the continent.
1530 BBC (east af/west af): The Learning Zone. See M 0630.
1530 BBC (eu/south as): British News. See S 1120.
1545 BBC (south as): World Business Report. See S 0630.

Mondays

1505 BBC (am): One Planet. See M 0305.
1505 BBC (east as): Meridian Ideas. See M 0205.
1505 BBC (me): Outlook. See M 1205.
1530 BBC (am): People and Places. See M 0330.
1530 BBC (east as): The Music Mix. See M 0230.
1545 BBC (am): People and Places. See M 0330.
1545 BBC (eu): Analysis. See M 0645.

Tuesdays

1505 BBC (am): Discovery. See M 1105.
1505 BBC (east as): Meridian Screen. See T 0205.
1505 BBC (me): Outlook. See M 1205.
1530 BBC (am): Variable Feature. See S 1105.
1530 BBC (east as): The UK Top Twenty. See T 0230.
1545 BBC (eu): Analysis. See M 0645.

Wednesdays

1505 BBC (am): Health Matters. See M 1105.
1505 BBC (east as): Meridian Music. See W 0205.
1505 BBC (me): Outlook. See M 1205.
1530 BBC (am): Everywoman. See M 1130.
1530 BBC (east as): The UK Album Chart. See W 0245.
1545 BBC (eu): From Our Own Correspondent. See S 0230.

Thursdays

1505 BBC (am/east as): Meridian Writing. See H 0205.
1505 BBC (me): Outlook. See M 1205.
1530 BBC (am): Science Perspective (8th,22nd). See T 1105.
1530 BBC (am): From Lab to Law (15th). See T 1105.
1530 BBC (am): Following Trends (29th). See T 1105.
1530 BBC (east as): World Music. See H 1430.
1545 BBC (am): Seeing Stars (8th). See T 1115.
1545 BBC (am): Soundbyte (22nd). See T 1115.
1545 BBC (eu): Analysis. See M 0645.

Fridays

1505 BBC (am): Sports International. See W 1105.
1505 BBC (east as): Meridian Masterpiece. See M 0505.
1505 BBC (me): Outlook. See M 1205.
1530 BBC (am): Pick of the World. See W 1130.
1530 BBC (east as): Music X-Press. See F 0230.
1545 BBC (eu): Analysis. See M 0645.

Saturdays

1500 BBC (am/east af/east as/eu/me/south as/west af): News. See S 1200.
1505 BBC (am/east af/east as/eu/me/south as/west af): Sportsworld. See A 1405.

Frequencies

1600	1700		Algeria, R Algiers International	11715va	15160va		
1600	1700		Anguilla, Caribbean Beacon	11775am			
1600	1700	vl	Australia, ABC/Alice Springs	2310do			
1600	1700	vl	Australia, ABC/Katherine	2485do			
1600	1700	vl	Australia, ABC/Tennant Creek	2325do			
1600	1700		Australia, Radio	5995as	9475as	9580va	11650pa
				11660as			
1600	1700	vl	Botswana, Radio	3356do	4820do	7255do	
1600	1700	vl	Cameroon, RTV/Yaounde	4850do			
1600	1700	vl	Canada, CBC Northern Service	9625do			
1600	1700		Canada, CFRX Toronto ON	6070do			
1600	1700		Canada, CFVP Calgary AB	6030do			
1600	1700		Canada, CHNX Halifax NS	6130do			
1600	1700		Canada, CKZN St John's NF	6160do			
1600	1700		Canada, CKZU Vancouver BC	6160do			
1600	1657		Canada, R Canada International	6140as	7150as		
1600	1656		China, China Radio International	7190af	9565af	9870af	
1600	1700		Costa Rica, R for Peace Intl	15049va	25930al		
1600	1700		Costa Rica, University Network	5030am	6150va	7375na	9725na
				11870va	13749af		
1600	1627		Czech Rep, Radio Prague Intl	5930eu	21745af		
1600	1630		Ecuador, HCJB	12005am	15115am		
1600	1700		Ethiopia, Radio	5990af	7110af	7165af	9560af
				9704af	11800af		
1600	1700		France, R France International	11615af	11995af	12015af	15210af
				17605af	17850af		
1600	1645		Germany, Deutsche Welle	6140eu	6170as	7225as	9735af
				11810af	17595as	21775af	
1600	1700	a	Germany, Good News World R	15105af			
1600	1700		Germany, Overcomer Ministries	5850eu	13810af		
1600	1630	s	Germany, Universal Life	15105af			
1600	1630		Germany, Voice of Hope	15715as	17550af		
1600	1700	vl	Ghana, Ghana BC Corp	4915do	6130do		
1600	1700		Guam, Adventist World Radio	9355as			
1600	1630	as	Guam, Trans World Radio	15330as			
1600	1700		Guyana, Voice of	5949do			
1600	1630		Iran, VOIRI	9635as	11775as		
1600	1700	irreg	Iraq, Radio Iraq International	7070va			
1600	1630		Jordan, Radio	11690eu			
1600	1700		Kenya, Kenya BC Corp	4885do	4915do	4935do	
1600	1700		Lebanon, Voice of Hope	6280me	11530va		
1600	1700	vl	Lesotho, Radio	4800do			
1600	1700	vl	Liberia, ELWA	4760do			
1600	1700	vl	Liberia, R Liberia International	6100do			
1600	1700	vl	Malawi, Malawi BC Corp	3380do			
1600	1700		Malaysia, Radio	7295do			
1600	1700		Namibia, Namibian BC Corp	7165af	7215af		
1600	1630		Netherlands, Radio	9890as	12065as	15590as	
1600	1650	occsnal	New Zealand, R New Zealand Int	6145va			
1600	1650	occsnal	New Zealand, R New Zealand Int	6145va			
1600	1700		New Zealand, ZLXA	3935do			
1600	1700	vl	Nigeria, Radio/Enugu	6025do			
1600	1700	vl	Nigeria, Radio/Ibadan	6050do			
1600	1700	vl	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do
1600	1700	vl	Nigeria, Radio/Lagos	3326do	4990do		
1600	1700	vl	Nigeria, Voice of	7255af	15120af		
1600	1656		North Korea, R Pyongyang	3560va	6520va	9600va	9975va
1600	1615		Pakistan, Radio	11570me	15100af	15334af	17510me
				17720af	17720af		
1600	1700		Palau, KHBN/Voice of Hope	9955as	9965as		
1600	1700	vl/mtwhfa	Papua New Guinea, NBC	9675do			4890do
1600	1700		Russia, Voice of Russia WS	9730eu	9875as	12015me	12025as
				12055me			
1600	1700	vl	Rwanda, Radio	6055do			
1600	1630		S Africa, Channel Africa	9525af			
1600	1700		S Africa, World Beacon	6145af			
1600	1700		Sierra Leone, Sierra Leone BS	5980do			
1600	1700		South Korea, R Korea Intl	5975om	9515af	9870af	
1600	1700		Sri Lanka, Sri Lanka BC Corp	4940do			
1600	1700		Swaziland, Trans World Radio	9500af			
1600	1640		UAE, Radio Dubai	13675eu	15395eu	21605eu	
1600	1700		Uganda, Radio	4976do	5026do		
1600	1700		UK, BBC World Service	3195as	5975as	6190af	6195af
				7160as	9515na	9740as	11940af
				12095eu	15310as	15400af	15485eu
				15575eu	17700as	17830am	17840am
				21470af	21660af		
1600	1700	a	UK, Global Kitchen/Merlin	9750eu	11785eu	15235eu	
1600	1700		USA, Armed Forces Network	4278am	6458am	12689am	
1600	1700		USA, KAIJ Dallas TX	13815va			
1600	1700		USA, KTBN Salt Lake City UT	15590na			
1600	1700		USA, KWHR Naalehu HI	9930as			
1600	1700		USA, VOA Special English	13600af	15445af	17895af	
1600	1700		USA, Voice of America	6035af	6160as	7125as	9645as
				9700me	9760as	13710af	15205va
				15225af	15255va	15410af	
1600	1700		USA, WEWN Birmingham AL	11875na	13615na	15745eu	
1600	1700		USA, WGTG McCaysville GA	12172am			
1600	1700	mtwhf	USA, WGTG McCaysville GA	9400va			
1600	1700		USA, WHRA Greenbush ME	17650af			
1600	1700		USA, WHRI Noblesville IN	13760na	15105sa		
1600	1700		USA, WINB Red Lion PA	13570eu			
1600	1700		USA, WJCR Upton KY	7490va	13594as		
1600	1700	smtwhf	USA, WMLK Bethel PA	9465eu			
1600	1700	s	USA, WRMI Miami FL	9955am			
1600	1700		USA, WRNO New Orleans LA	7395na	15420al		
1600	1700		USA, WSHB Cypress Crk SC	18910af			
1600	1700		USA, WTJC Newport NC	9370na			
1600	1700		USA, WWCR Nashville TN	9475na	12160na	13845na	15685na
1600	1700		USA, WYFR Okeechobee FL	11830na	15600na	17750na	18980na
				21455eu	21525af		
1600	1610		Vatican City, Vatican Radio	12065au	13765au	17540au	
1600	1700		Zambia, Christian Voice	4965do			
1600	1700	vl	Zambia, National BC Corp	6165do	6265do		
1600	1630	vl	Zimbabwe, Zimbabwe BC Corp	5975do	6045do		
1615	1630	as	UK, BBC World Service	11860af	15420af	21490af	
1615	1630		Vatican City, Vatican Radio	4005eu	5880eu	7250eu	9645eu
				15595eu			
1625	1640		Armenia, Trans World Radio	5895me			
1625	1640		Monaco, Trans World Radio	6145me			
1630	1700		Austria, R Austria International	6155eu	13730va	15240me	17765as
1630	1700		Egypt, Radio Cairo	15255af			
1630	1700	s	Seychelles, FEBA Radio	11605as			
1630	1700		Slovakia, R Slovakia International	5920eu	6055eu	7345eu	
1630	1700	as	UK, BBC World Service	11860af	21490af		
1630	1700	mtwhf	UK, Merlin Network One	12065as			
1630	1657		Vietnam, Voice of	7145eu	9730eu		
1630	1700	vl	Zimbabwe, Zimbabwe BC Corp	4828do	6045do		
1645	1700		Germany, Deutsche Welle	6140eu			
1650	1700	mtwhf	New Zealand, R New Zealand Int	6145va			

Selected Programs

Sundays

1600 BBC (am/east as/me): News. See S 1200.
1600 BBC (eu/west af): News Summary. See S 1100.
1600 BBC (east af/south as/west af): Play of the Week (from 1500). See S 0530.
1605 BBC (am/east as/eu/me/east af/south as/west af): Sunday Sportsworld. The Sunday sports magazine.

Monday-Friday

1600 BBC (am/east as/eu): Europe Today. All the latest news, analysis and comment.
1600 BBC (me): News Briefing. See S 0000.
1600 BBC (east af/south as/west af): News. See S 1200.
1630 BBC (am/eu): World Business Report. See S 0630.
1630 BBC (east as): World Business Review. See M 0030.
1645 BBC (am/east as/eu): Sports Roundup. See S 0020.

Mondays

1605 BBC (east af/me/west af): Meridian Ideas. See M 0205.
1605 BBC (south as): Health Matters. See M 1105.
1630 BBC (east af): Fast Track. The latest African sports news and action.
1630 BBC (me): The Music Mix. See M 0230.
1630 BBC (south as): Everywoman. See M 1130.
1630 BBC (west af): Fast Track. See M 1630.

Tuesdays

1605 BBC (east af/me/west af): Meridian Screen. See T 0205.
1605 BBC (south as): Science Perspective (6th,20th). See T 1105.
1605 BBC (south as): From Lab to Law (13th). See T 1105.
1605 BBC (south as): Following Trends (27th). See T 1105.
1615 BBC (south as): Seeing Stars (6th). See T 1115.
1615 BBC (south as): Soundbyte (20th). See T 1115.
1630 BBC (east af): African Perspective. See S 0430.
1630 BBC (me): The UK Top Twenty. See T 0230.
1630 BBC (south as): Focus on Faith. See T 1130.
1630 BBC (west af): African Perspective. See S 0430.

Wednesdays

1605 BBC (east af/me/west af): Meridian Music. See W 0205.
1605 BBC (south as): Sports International. See W 1105.
1630 BBC (east af): Talkabout Africa. Telephone conversations with BBC correspondents on late-breaking African events.
1630 BBC (me): The UK Album Chart. See W 0245.
1630 BBC (south as): Pick of the World. See W 1130.
1630 BBC (west af): Talkabout Africa. See W 1630.

Thursdays

1605 BBC (east af/me/west af): Meridian Writing. See H 0205.
1605 BBC (south as): One Planet. See M 0305.
1630 BBC (east af): Art Beat. See S 0530.
1630 BBC (me): World Music. See H 1430.
1630 BBC (south as): People and Places. See M 0330.
1630 BBC (west af): Art Beat. See S 0530.
1645 BBC (south as): People and Places. See M 0330.

Fridays

1605 BBC (east af/me/west af): Meridian Masterpiece. See M 0505.
1605 BBC (south as): Discovery. See M 1105.
1630 BBC (east af): Fast Track. See M 1630.
1630 BBC (me): Music X-Press. See F 0230.
1630 BBC (south as): Variable Feature. See S 1105.
1630 BBC (west af): Fast Track. See M 1630.

Saturdays

1600 BBC (am/east af/east as/eu/me/south as/west af): News.
1605 BBC (am/east af/east as/eu/me/south as): Sportsworld.

FREQUENCIES

1700	1800		Anguilla, Caribbean Beacon	11775am				
1700	1800	vl	Australia, ABC/Alice Springs	2310do				
1700	1800	vl	Australia, ABC/Katherine	2485do				
1700	1800	vl	Australia, ABC/Tennant Creek	2325do				
1700	1800		Australia, Radio 5995as	9475as	9580va	9815pa	11880va	
1700	1730		Azerbaijan, Voice of	9165eu				
1700	1800	vl	Botswana, Radio	3356do	4820do	7255do		
1700	1800	vl	Cameroon, RTV/Yaounde	4850do				
1700	1800	vl	Canada, CBC Northern Service	9625do				
1700	1800		Canada, CFRX Toronto ON	6070do				
1700	1800		Canada, CFVP Calgary AB	6030do				
1700	1800		Canada, CHNX Halifax NS	6130do				
1700	1800		Canada, CKZN St John's NF	6160do				
1700	1800		Canada, CKZU Vancouver BC	6160do				
1700	1756		China, China Radio International	9570af	9670af	9675af	11910af	
				13700af				
1700	1800		Costa Rica, R for Peace Intl	15049va	25930al			
1700	1800		Costa Rica, University Network	5030am	6150va	7375na	9725na	
				11870va	13749af			
1700	1727		Czech Rep, Radio Prague Intl	5930eu	21745af			
1700	1800		Egypt, Radio Cairo	15255af				
1700	1800	mtwhf	Eqt Guinea, Radio Africa	15185af				
1700	1730		France, R France International	15210af	17605af			
1700	1730		Georgia, Georgian Radio	11910eu				
1700	1800		Germany, Deutsche Welle	6140eu				
1700	1800	a	Germany, Good News World R	11795me				
1700	1800	vl	Ghana, Ghana BC Corp	3366do	4915do			
1700	1800		Guyana, Voice of	5949do				
1700	1800	vl	Italy, IRRS	3980va	3985al			
1700	1800		Japan, Radio	9505na	12000eu	15355af		
1700	1800		Kenya, Kenya BC Corp	4885do	4915do	4935do		
1700	1800		Lebanon, Voice of Hope	6280me	11530va			
1700	1800	vl	Lesotho, Radio	4800do				
1700	1800	vl	Liberia, ELWA	4760do				
1700	1800	vl	Liberia, R Liberia International	6100do				
1700	1800	vl	Malawi, Malawi BC Corp	3380do				
1700	1800		Malaysia, Radio	7295do				
1700	1800		Namibia, Namibian BC Corp	3270af	3289af			
1700	1800	mtwh	New Zealand, R New Zealand Int	6145va				
1700	1800		New Zealand, ZLXA	3935do				
1700	1800	vl	Nigeria, Radio/Enugu	6025do				
1700	1800	vl	Nigeria, Radio/Ibadan	6050do				
1700	1800	vl	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do	
1700	1800	vl	Nigeria, Radio/Lagos	3326do	4990do			
1700	1800		Palau, KHBN/Voice of Hope	9955as	9965as			
1700	1800	vl/mtwhfa	Papua New Guinea, NBC	4890do	9675do			
1700	1755		Poland, Radio Polonia	6000eu	7285eu			
1700	1756		Romania, R Romania International	15250eu	15390eu	17735eu	17805eu	
1700	1800	smwha	Russia, Voice of Russia WS	9820eu				
1700	1800		Russia, Voice of Russia WS	9710eu	9775eu	9890eu	11510af	
				11675eu	12015af	12055me		
1700	1800	vl	Rwanda, Radio	6055do				
1700	1730		S Africa, Channel Africa	17860af				
1700	1800		S Africa, World Beacon	6145af				
1700	1800		Sierra Leone, Sierra Leone BS	5980do				
1700	1800	irreg	Sri Lanka, Sri Lanka BC Corp	4940do				
1700	1800	vl	Sudan, Radio Omdurman	7199do	9200do	9505do		
1700	1730		Swaziland, Trans World Radio	9500af				
1700	1800		Uganda, Radio	4976do	5026do			
1700	1800		UK, BBC World Service	3255af	3915af	5975as	6005af	
				6190af	7160as	9510as	9630af	
				9740as	12095eu	15400af	15420af	
				15485eu	15575me	17830af	17840na	
1700	1730	mtwhf	UK, Merlin Network One	12065as				
1700	1800		USA, Armed Forces Network	4278am	6458am	12689am		
1700	1800		USA, KAIJ Dallas TX	13815va				
1700	1800		USA, KTBN Salt Lake City UT	15590na				
1700	1800		USA, KWHR Naalehu HI	9930as				
1700	1800		USA, Voice of America	6160as	7125as	7170as	9645as	
				9700me	9760af	15255va	15410af	
				15445af	17895af			
1700	1800	mtwhf	USA, Voice of America	5990as	6045as	7150as	9550as	
				9770as				
1700	1800		USA, WEWN Birmingham AL	11875na	13615na	15745eu		
1700	1800		USA, WGTG McCaysville GA	12172am				
1700	1800	mtwhf	USA, WGTG McCaysville GA	9400va				
1700	1800		USA, WHRA Greenbush ME	17650af				
1700	1800		USA, WHRI Noblesville IN	9495sa	13760na			
1700	1800		USA, WINB Red Lion PA	13570eu				
1700	1800		USA, WJCR Upton KY	7490va	13594as			
1700	1800	smtwhf	USA, WMLK Bethel PA	9465eu				
1700	1800		USA, WRNO New Orleans LA	7395na	15420al			
1700	1800		USA, WSHB Cypress Crk SC	18910af				
1700	1800		USA, WTJC Newport NC	9370na				
1700	1800		USA, WWCR Nashville TN	9475na	12160na	13845na	15685na	
1700	1800		USA, WYFR Okeechobee FL	18980eu	21455eu			
1700	1800		Zambia, Christian Voice	4965do				
1700	1800	vl	Zambia, National BC Corp	6165do	6265do			
1700	1800	vl	Zimbabwe, Zimbabwe BC Corp	4828do	6045do			
1730	1800		Belgium, Radio Vlaanderen Intl	5910eu	9925eu	13710eu	17735af	
1730	1800	as	Georgia, Georgian Radio	6080eu				
1730	1800		Guam, Adventist World Radio	11560va	11965va	11965as		
1730	1745	vl	Libya, Voice of Africa	11815af	15415af	15435va		
1730	1800		Netherlands, Radio	6020af	7120af	11655af		
1730	1800		Philippines, Radio Filipinas	11720me	15190me	17720me		
1730	1800		S Africa, Adventist World Radio	12130va				
1730	1745	mtwhf	Swaziland, Trans World Radio	3200af				
1730	1800	mtwhfa	Sweden, Radio	6065eu				
1730	1800	s	Sweden, Radio	13800eu				
1730	1800	s	UK, BBC World Service	9750as	12045as	15310as		
1730	1800	mtwhf	UK, Merlin Network One	12065as	15560as			
1730	1800		Vatican City, Vatican Radio	13765af	15570af	17515af		
1735	1745	vl/th	Paraguay, Radio Nacional	9739sa				
1745	1800		Bangladesh, Bangla Betar	7184eu	7462eu	9558eu	15520eu	
1745	1800		India, All India Radio	7410eu	9950eu	11620eu	11935af	
				13750af	15075af	15200af		
1745	1800		Swaziland, Trans World Radio	3200af				
1800	1900		Anguilla, Caribbean Beacon	11775am				
1800	1900	mtwhf	Argentina, RAE	15345eu				
1800	1900	vl	Australia, ABC/Alice Springs	2310do				
1800	1900	vl	Australia, ABC/Katherine	2485do				
1800	1900	vl	Australia, ABC/Tennant Creek	2325do				
1800	1900		Australia, Radio	6080pa	7240pa	9475as	9580va	
				9815pa	11880va			
1800	1900		Bangladesh, Bangla Betar	7184eu	7462eu	9558eu	15520eu	
1800	1900	vl	Botswana, Radio	3356do	4820do			
1800	1900	vl	Cameroon, RTV/Yaounde	4850do				
1800	1900		Canada, CFRX Toronto ON	6070do				
1800	1900		Canada, CFVP Calgary AB	6030do				
1800	1900		Canada, CHNX Halifax NS	6130do				
1800	1900		Canada, CKZN St John's NF	6160do				
1800	1900		Canada, CKZU Vancouver BC	6160do				
1800	1900		Costa Rica, R for Peace Intl	15049va	25930al			
1800	1900		Costa Rica, University Network	5030am	6150va	7375na	9725na	
				11870va	13749af			
1800	1830		Egypt, Radio Cairo	15255af				
1800	1900	mtwhf	Eqt Guinea, Radio Africa	15185af				
1800	1900		Germany, Deutsche Welle	6140eu				
1800	1900	vl	Ghana, Ghana BC Corp	3366do	4915do			
1800	1900	s	Greece, Voice of	9420eu	15630af	17705na		
1800	1900		Guyana, Voice of	5949do				
1800	1900		India, All India Radio	7410eu	9950eu	11620eu	11935af	
				13750af	15075af	15200af		
1800	1900	vl	Italy, IRRS	3980va	3985al			
1800	1900		Kenya, Kenya BC Corp	4885do	4915do	4935do		
1800	1900		Kuwait, Radio	11990va	15230as			
1800	1900		Lebanon, Voice of Hope	6280me	11530va			
1800	1900	vl	Lesotho, Radio	4800do				
1800	1900	vl	Liberia, ELWA	4760do				
1800	1900	vl	Liberia, R Liberia International	5100do				
1800	1900	vl	Malawi, Malawi BC Corp	3380do				
1800	1900		Malaysia, Radio	7295do				
1800	1900		Namibia, Namibian BC Corp	3270af	3289af			
1800	1830		Netherlands, Radio	6020af	7120af	11655af		
1800	1850	mtwhf	New Zealand, R New Zealand Int	6145va				
1800	1900		New Zealand, ZLXA	3935do				
1800	1900	vl	Nigeria, Radio/Enugu	6025do				
1800	1900	vl	Nigeria, Radio/Ibadan	6050do				
1800	1900	vl	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do	
1800	1900	vl	Nigeria, Radio/Lagos	3326do	4990do			
1800	1900		Palau, KHBN/Voice of Hope	9965as				
1800	1830	vl/mtwhfa	Papua New Guinea, NBC	4890do	9675do			
1800	1900		Philippines, Radio Filipinas	11720me	15190me	17720me		
1800	1900		Russia, Voice of Russia WS	7330eu	9710eu	9720eu	9775eu	
				9820eu	9890eu	11510af	11675eu	
				11695af	12015af			
1800	1900	vl	Rwanda, Radio	6055do				
1800	1830		S Africa, Adventist World Radio	5960af	6100af			
1800	1900	m	S Africa, Amateur Radio League	3215af				
1800	1830		S Africa, Channel Africa	17870af				
1800	1900		S Africa, World Beacon	9675af				
1800	1900		Sierra Leone, Sierra Leone BS	5980do				
1800	1900	irreg	Sri Lanka, Sri Lanka BC Corp	4940do				
1800	1900		Swaziland, Trans World Radio	3200af				
1800	1900		Taiwan, R Taiwan International	3955eu				
1800	1900		Uganda, Radio	4976do	5026do			
1800	1830		UK, BBC World Service	3255af	5975as	6190af	9410eu	
				9510as	9740pa	12095eu	15400af	
				15420af	15575as	17830af		
1800	1900	a	UK, BBC World Service	17840na				
1800	1900	mtwhf	UK, Merlin Network One	12065as				
1800	1900	hf	UK, Merlin Network One	6130af				
1800	1830		UK, RTE Radio	15315me				
1800	1900		UK, World Beacon	9675af				
1800	1900		USA, Armed Forces Network	4278am	6458am	12689am		
1800	1900		USA, KAIJ Dallas TX	13815va				
1800	1900		USA, KJES Vado NM	15385	au			
1800	1900		USA, KTBN Salt Lake City UT	15590na				
1800	1900		USA, KWHR Naalehu HI	17510as				
1800	1900		USA, Voice of America	6035af	7415af	9760af	9770me	
				11975af	15410af	15580af	17895af	
1800	1900		USA, WEWN Birmingham AL	11875na	13615na	15745eu		
1800	1900		USA, WGTG McCaysville GA	12172am				
1800	1900	mtwhf	USA, WGTG McCaysville GA	9400va				
1800	1900		USA, WHRA Greenbush ME	17650af				
1800	1900		USA, WHRI Noblesville IN	9495sa	13760na			
1800	1900		USA, WINB Red Lion PA	13570eu				
1800	1900		USA, WJCR Upton KY	7490va	13594as			
1800	1900	smtwhf	USA, WMLK Bethel PA	9465eu				
1800	1900		USA, WRNO New Orleans LA	7395na	15420al			
1800	1900		USA, WSHB Cypress Crk SC	15665eu	18910af			
1800	1900		USA, WTJC Newport NC	9370na				
1800	1900		USA, WWCR Nashville TN	9475na	12160na	13845na	15685na	
1800	1900		USA, WYFR Okeechobee FL	17555eu				
1800	1827		Vietnam, Voice of	7145eu	7440eu	9730eu	12070eu	
1800	1900		Yemen, Rep of Yemen Radio	9779me				
1800	1900		Zambia, Christian Voice	4965do				
1800	1900	vl	Zambia, National BC Corp	6165do	6265do			
1800	1900	vl	Zimbabwe, Zimbabwe BC Corp	4828do	6045do			
1830	1845		Albania, R Tirana International	7180eu	9510eu			
1830	1900		Ascension Is, RTE Radio	21630af				
1830	1900		Austria, R Austria International	13730af				
1830	1900		Canada, RTE Radio	13725va				
1830	1900		Georgia, Georgian Radio	11760eu				
1830	1900		Kiribati, Radio	9809do	9825do			
1830	1900		Netherlands, Radio	6020af	7120af	9895af	11655af	
				13700af	17605af	21590af		
1830	1900		Serbia, Radio Yugoslavia	6100eu				
1830	1900		Slovakia, R Slovakia International	5920eu	6055eu	7345eu		
1830	1900		Turkey, Voice of	9785as	11765as			
1830	1900		UK, BBC World Service	3255af	6005af	6190af	9410eu	
				9630af	9740pa	12095eu	15400af	
				15420af	15575as	17830af		
1830	1900		UK, RTE Radio	13725na	21630af			
1830	1900	as	USA, Voice of America	7170af	11940af	15525af		
1851	1900		New Zealand, R New Zealand Int	11725va				
1855	1900	as	New Zealand, R New Zealand Int	11725va				

FREQUENCIES

1900	2000		Anguilla, Caribbean Beacon		11775am			
1900	2000	vl	Australia, ABC/Katherine		2485do			
1900	2000	vl	Australia, ABC/Tennant Creek		2325do			
1900	2000		Australia, Radio		6080pa	7240pa	9500as	9580va
					9815pa	11880va		
1900	2000	vl	Botswana, Radio		3356do	4820do		
1900	2000		Bulgaria, Radio		9400na	11700eu		
1900	2000	vl	Cameroon, RTV/Yaounde		4850do			
1900	2000		Canada, CFRX Toronto ON		6070do			
1900	2000		Canada, CFVP Calgary AB		6030do			
1900	2000		Canada, CHNX Halifax NS		6130do			
1900	2000		Canada, CKZN St John's NF		6160do			
1900	2000		Canada, CKZU Vancouver BC		6160do			
1900	1956		China, China Radio International		9440af	9595af	11750af	
1900	2000		Costa Rica, R for Peace Intl		15049va	25930al		
1900	2000		Costa Rica, University Network		5030am	6150va	7375na	9725na
					11870va	13749af		
1900	2000		Ecuador, HCJB		17660eu			
1900	2000	mtwhf	Eqt Guinea, Radio Africa		15185af			
1900	1945		Germany, Deutsche Welle	11765af	11810af	13720af	15390af	17810af
1900	2000	vl	Ghana, Ghana BC Corp		3366do	4915do		
1900	1930		Hungary, Radio Budapest		6025eu	9750eu		
1900	1945		India, All India Radio		7410eu	9950eu	11620eu	11935af
					13750af	15075af	15200af	
1900	1930		Israel, Kol Israel		11605af	15640va	15650af	17535va
1900	2000	vl	Italy, IRRS		3980va	3985al		
1900	2000		Kenya, Kenya BC Corp		4885do	4915do	4935do	
1900	2000		Kiribati, Radio		9809do	9825do		
1900	2000		Kuwait, Radio		11990va	15230as		
1900	2000		Lebanon, Voice of Hope		6280me	11530va		
1900	2000	vl	Lesotho, Radio		4800do			
1900	2000	vl	Liberia, ELWA		4760do			
1900	2000	vl	Liberia, R Liberia International		5100do			
1900	2000	vl	Malawi, Malawi BC Corp		3380do			
1900	2000		Malaysia, Radio		7295do			
1900	2000	mtwhfa	Malta, Voice of Mediterranean		12060eu			
1900	2000		Namibia, Namibian BC Corp		3270af	3289af		
1900	2000		Netherlands, Radio		6020af	7120af	11655af	13700af
					17605af	21590af		
1900	1950	as	New Zealand, R New Zealand Int		11725va			
1900	2000		New Zealand, ZLXA		3935do			
1900	2000	vl	Nigeria, Radio/Enugu		6025do			
1900	2000	vl	Nigeria, Radio/Ibadan		6050do			
1900	2000	vl	Nigeria, Radio/Kaduna		4770do	6090do	7275do	9570do
1900	2000	vl	Nigeria, Radio/Lagos		3326do	4990do		
1900	2000	vl	Nigeria, Voice of		7255af	15120af		
1900	2000		North Korea, R Pyongyang	4405va	6574na	9335na	11710na	13760na
1900	1930	vl/mtwhfa	Papua New Guinea, NBC		4890do	9675do		
1900	1930		Philippines, Radio Filipinas		11720me	15190me	17720pa	
1900	2000		Russia, Voice of Russia WS		9710eu	9775eu	9820eu	9890eu
					11675eu	12070eu		
1900	2000	vl	Rwanda, Radio		6055do			
1900	2000		S Africa, World Beacon		9675af			
1900	2000		Sierra Leone, Sierra Leone BS		3316do			
1900	2000	vl	Solomon Islands, SIBC		5020do			
1900	2000		South Korea, R Korea Intl		5975om	7275eu		
1900	2000	irreg	Sri Lanka, Sri Lanka BC Corp		4940do			
1900	2000	a	Sri Lanka, Sri Lanka BC Corp		6010eu			
1900	2000		Swaziland, Trans World Radio		3200af			
1900	1930		Switzerland, Swiss R International		6110eu			
1900	2000		Thailand, Radio		7195eu	9655eu	11905eu	
1900	1930		Turkey, Voice of		9785as	11765as		
1900	2000		Uganda, Radio		4976do	5026do		
1900	2000		UK, BBC World Service		3255af	6005af	6190af	6190eu
					9410eu	9630af	9740pa	12095eu
					15400af	15575me	17830af	
1900	2000	a	UK, BBC World Service		17840na			
1900	2000	hf	UK, Merlin Network One		6130af			
1900	2000		UK, World Beacon		9675af			
1900	2000		USA, Armed Forces Network		4278am	6458am	12689am	
1900	2000		USA, KAIJ Dallas TX		13815va			
1900	2000		USA, KTBN Salt Lake City UT		15590na			
1900	2000		USA, KWHR Naalehu HI		17510as			
1900	2000		USA, VOA Special English		6160me	9680me	13690me	
1900	1930		USA, Voice of America		7260me	9525pa	9760af	9770af
					11870pa	15180pa		
1900	1930	as	USA, Voice of America		6035af	7375af	7415af	11975af
					15410af	15445af	15580af	
1900	1930	a	USA, Voice of America		4950af			
1900	2000	mtwhf	USA, Voice of America		9565eu	9840as	11780me	11970as
					12015as	13725me	15235as	
1900	2000		USA, WEWN Birmingham AL		11875na	13615na	15745eu	
1900	2000		USA, WGTG McCaysville GA		12172am			
1900	2000	mtwhf	USA, WGTG McCaysville GA		9400va			
1900	2000		USA, WHRA Greenbush ME		17650af			
1900	2000		USA, WHRI Noblesville IN		9495sa	13760na		
1900	2000		USA, WINB Red Lion PA		13570eu			
1900	2000		USA, WJCR Upton KY		7490va	13594as		
1900	2000	smtwhf	USA, WMLK Bethel PA		9465eu			
1900	2000	as	USA, WRMI Miami FL		9955am			
1900	2000		USA, WRNO New Orleans LA		7395na	15420al		
1900	2000		USA, WSHB Cypress Crk SC		15665eu	18910af		
1900	2000		USA, WTJC Newport NC		9370na			
1900	2000		USA, WWCR Nashville TN		9475na	12160na	13845na	15685na
1900	2000		USA, WYFR Okeechobee FL		17555eu			
1900	1927		Vietnam, Voice of		7145eu	9730eu		
1900	2000		Zambia, Christian Voice		4965do			
1900	2000	vl	Zambia, National BC Corp		6165do	6265do		
1900	2000	vl	Zimbabwe, Zimbabwe BC Corp		4828do	6045do		
1930	2000	t h	Belarus, Radio Minsk		7210va	11960va		
1930	1956		Belgium, Radio Vlaanderen Intl		5960eu			
1930	1945		Finland, YLE/R Finland		6110eu			
1930	2000		Iran, VOIRI		9022eu	9575eu	11670eu	
1930	2000	vl	Papua New Guinea, NBC		4890do	9675do		
1930	2000		Poland, Radio Polonia		6035eu	7185eu	7265eu	9525eu
1930	2000		Sweden, Radio		6065eu			
1930	2000		USA, Voice of America		4950af	6035af	7260me	7375af
				7415af	9525pa	9760af	9770af	11870pa
				11975af	15180pa	15410af	15445af	15580af
1935	1955		Itay, RAI International		5970eu	7290eu	9750eu	
1940	1950	m	Vatican City, Vatican Radio		9660eu			
1950	2000		Vatican City, Vatican Radio		4005eu	5880eu	7250eu	9645eu
1950	2000	m	Vatican City, Vatican Radio		9660eu			
1951	2000		New Zealand, R New Zealand Int		17675va			
1955	2000	mtwhfa	Armenia, Voice of		4810eu	9965eu		

2000	2100		Algeria, R Algiers International		11750eu	15160eu		
2000	2100		Angola, R. Nacional de Angola		3374va	7245va		
2000	2100		Anguilla, Caribbean Beacon		11775am			
2000	2015	mtwhfa	Armenia, Voice of		4810eu	9965eu		
2000	2100	vl	Australia, ABC/Alice Springs		2310do			
2000	2100	vl	Australia, ABC/Katherine		2485do			
2000	2100	vl	Australia, ABC/Tennant Creek		2325do			
2000	2100		Australia, Radio		9500as	9580va	9815pa	11880va
					12080va			
2000	2100	vl	Botswana, Radio		3356do	4820do		
2000	2100	vl	Cameroon, RTV/Yaounde		4850do			
2000	2100		Canada, CFRX Toronto ON		6070do			
2000	2100		Canada, CFVP Calgary AB		6030do			
2000	2100		Canada, CHNX Halifax NS		6130do			
2000	2100		Canada, CKZN St John's NF		6160do			
2000	2100		Canada, CKZU Vancouver BC		6160do			
2000	2100		Canada, R Canada International		5995va	11690va	13650va	13670va
					15325va	15470va	17820va	17870va
2000	2056		China, China Radio International		9440af	11735af	13640af	15110eu
					17790eu			
2000	2100		Costa Rica, R for Peace Intl		15049va	25930al		
2000	2100		Costa Rica, University Network		5030am	6150va	7375na	9725na
					11870va	13749af		
2000	2027		Czech Rep, Radio Prague Intl		5930eu	11600as		
2000	2100		Ecuador, HCJB		17660eu			
2000	2100	mtwhf	Eqt Guinea, Radio Africa		15185af			
2000	2045		Germany, Deutsche Welle		7130eu			
2000	2100	vl	Ghana, Ghana BC Corp		3366do	4915do		
2000	2100		Indonesia, Voice of		9525va	11784va	15149va	
2000	2030		Iran, VOIRI		9022eu	9575eu	11670eu	
2000	2100	irreg	Iraq, Radio Iraq International		9684va	11787va		
2000	2100	vl	Italy, IRRS		3980va	3985	al	
2000	2100		Kenya, Kenya BC Corp		4885do	4915do	4935do	
2000	2100		Kiribati, Radio		9809do	9825do		
2000	2100		Kuwait, Radio		11990va	15230as		
2000	2100		Lebanon, Voice of Hope		6280me	11530va		
2000	2100	vl	Lesotho, Radio		4800do			
2000	2100	vl	Liberia, ELWA		4760do			
2000	2100	vl	Liberia, R Liberia International		5100do			
2000	2100	vl	Malawi, Malawi BC Corp		3380do			
2000	2100		Malaysia, Radio		7295do			
2000	2030		Mongolia, Voice of		12015eu	12085eu		
2000	2100		Namibia, Namibian BC Corp		3270af	3289af		
2000	2030		Netherlands, Radio		6020af	7120af	11655af	13700af
					17605af	21590af		
2000	2100		New Zealand, R New Zealand Int		17675va			
2000	2100		New Zealand, ZLXA		3935do	7290do		
2000	2100	vl	Nigeria, Radio/Enugu		6025do			
2000	2100	vl	Nigeria, Radio/Ibadan		6050do			
2000	2100	vl	Nigeria, Radio/Kaduna		4770do	6090do	7275do	9570do
2000	2100	vl	Nigeria, Radio/Lagos		3326do	4990do		
2000	2100	vl	Nigeria, Voice of		7255af	15120af		
2000	2100	vl	Papua New Guinea, NBC		4890do	9675do		
2000	2025		Poland, Radio Polonia		6035eu	7185eu	7265eu	9525eu
2000	2100		Russia, Voice of Russia WS		9775eu	9775eu	9820eu	9890eu
					11675eu	15485eu		
2000	2100	vl	Rwanda, Radio		6055do			
2000	2100		S Africa, World Beacon		9675af			
2000	2100		Sierra Leone, Sierra Leone BS		3316do			
2000	2100	vl	Solomon Islands, SIBC		5020do			
2000	2100	mtwhf	Spain, R Exterior Espana		9595af	9595af	15285eu	
2000	2100	irreg	Sri Lanka, Sri Lanka BC Corp		4940do			
2000	2015		Swaziland, Trans World Radio		3200af			
2000	2030		Switzerland, Swiss R International		13710af	13770af	15220af	17580af
2000	2100	vl	Syria, Radio Damascus		12085eu	13610eu		
2000	2100		Uganda, Radio		4976do	5026do		
2000	2100		UK, BBC World Service		3255af	5975pa	6005af	6190af
					6195eu	9410eu	9630af	9740pa
					11835eu	12095eu	15400af	17830af
2000	2100		UK, World Beacon		9675af			
2000	2100		USA, Armed Forces Network		4278am	6458am	12689am	
2000	2100		USA, KAIJ Dallas TX		13815va			
2000	2100		USA, KJES Vado NM		15385au			
2000	2100		USA, KTBN Salt Lake City UT		15590na			
2000	2100		USA, KWHR Naalehu HI		17510as			
2000	2030		USA, Voice of America		4950af	6035af	6095me	7375af
					7415af	9760af	9770af	11855af
					11975af	15410af	15445af	15580af
					17725af	17745af		
2000	2100		USA, WBCQ Monticello ME		7415na			
2000	2100		USA, WEWN Birmingham AL		11875na	13615na	15745eu	
2000	2100		USA, WGTG McCaysville GA		12172am			
2000	2100	mtwhf	USA, WGTG McCaysville GA		9400va			
2000	2100		USA, WHRA Greenbush ME		17650af			
2000	2100		USA, WHRI Noblesville IN		5745sa	9495sa		
2000	2100		USA, WINB Red Lion PA		13570eu			
2000	2100		USA, WJCR Upton KY		7490va	13594as		
2000	2100	smtwhf	USA, WMLK Bethel PA		9465eu			
2000	2100	s	USA, WRMI Miami FL		9955am			
2000	2100	a	USA, WRMI Miami FL		7385na			
2000	2100		USA, WRNO New Orleans LA		7395na	15420al		
2000	2100		USA, WSHB Cypress Crk SC		15665eu	18910af		
2000	2100		USA, WTJC Newport NC		9370na			
2000	2100		USA, WWCR Nashville TN		9475na	12160na	13845na	15685na
2000	2100		USA, WYFR Okeechobee FL		17555eu	17845af		
2000	2100	vl	Vanuatu, Radio		3945do	4960do	7260do	
2000	2010		Vatican City, Vatican Radio		4005eu	5880eu	7250eu	9645eu
					9660af	11625af	13765af	
2000	2027		Vietnam, Voice of		7145eu	9730eu		
2000	2100		Zambia, Christian Voice		4965do			
2000	2100	vl	Zambia, National BC Corp		6165do	6265do		
2000	2100	vl	Zimbabwe, Zimbabwe BC Corp		4828do	6045do		
2005	2010		Croatia, Croatian Radio		9430	au	11805af	
2010	2030		Vatican City, Vatican Radio		9660af	11625af	13765af	
2025	2045		Itay, RAI International		7125af	9710af	11880af	
2030	2100	th	Belarus, Radio Minsk		7210va	11960va		
2030	2100		Cuba, Radio Havana		13660eu	13750eu		
2030	2100		Egypt, Radio Cairo		15375af			
2030	2100		Germany, Adventist World Radio		15560af			
2030	2045	vl	Libya, Voice of Africa		11815af	15415af	15435va	
2030	2055		Moldova, Radio Moldova Intl		7520eu			
2030	2100		S Africa, Adventist World Radio		9745af			
2030	2045		Thailand, Radio		9655eu	9680eu	11905eu	
2030	2100		Turkey, Voice of		9525eu			
2030	2100	f	UK, Wales Radio Intl/Merlin		7325eu			
2030	2100	as	USA, Voice of America		4950af			
2030	2100		Uzbekistan, Radio Tashkent		9540eu	9545eu		
2030	2057		Vietnam, Voice of		7145eu	9730eu		
2045	2100		India, All India Radio		7150au	7410eu	9650eu	9910au
					9950eu	11715au		

FREQUENCIES

2100	2200		Anguilla, Caribbean Beacon	11775am			
2100	2130	vl	Australia, ABC/Alice Springs	2310do			
2100	2130	vl	Australia, ABC/Katherine	2485do			
2100	2130	vl	Australia, ABC/Tennant Creek	2325do			
2100	2130		Australia, Radio	7240pa	9500as	9580va	9660pa
				11880va	12080va	17715pa	21740va
2100	2200	vl	Botswana, Radio	3356do	4820do		
2100	2200		Bulgaria, Radio	9400eu	11700eu		
2100	2200	vl	Cameroon, RTV/Yaounde	4850do			
2100	2200	vl	Canada, CBC Northern Service	9625do			
2100	2200		Canada, CFRX Toronto ON	6070do			
2100	2200		Canada, CFVP Calgary AB	6030do			
2100	2200		Canada, CHNX Halifax NS	6130do			
2100	2200		Canada, CKZN St John's NF	6160do			
2100	2200		Canada, CKZU Vancouver BC	6160do			
2100	2200		Canada, R Canada International	7235va	11690va	13650va	13670va
				15325va	15470va	17870va	
2100	2130		China, China Radio International	11735af	13640af	15110eu	17790eu
2100	2200		Costa Rica, R for Peace Intl	15049va	25930al		
2100	2200		Costa Rica, University Network	5030am	6150va	7375na	9725na
				11870va	13749af		
2100	2130		Cuba, Radio Havana	13660eu	13750eu		
2100	2200		Ecuador, HCJB	17660eu			
2100	2200		Egypt, Radio Cairo	15375af			
2100	2200	mtwhf	Eqt Guinea, Radio Africa	15185af			
2100	2145		Germany, Deutsche Welle	9670as	9765as	9875af	11865af
				11915as	15135va		
2100	2200	vl	Ghana, Ghana BC Corp	3366do	4915do		
2100	2130		Hungary, Radio Budapest	6025eu			
2100	2200		India, All India Radio	7150va	7410eu	9650eu	9910au
				9950eu	11715au		
2100	2200	vl	Italy, IRRS	3980va	3985al		
2100	2200		Japan, Radio	6035pa	9725eu	11850pa	11855af
				17825na	21670pa		
2100	2130		Kenya, Kenya BC Corp	4885do	4915do	4935do	
2100	2200		Kiribati, Radio	9809do	9825do		
2100	2200	vl	Lesotho, Radio	4800do			
2100	2200	vl	Liberia, ELWA	4760do			
2100	2200	vl	Liberia, R Liberia International	5100do			
2100	2200	vl	Malawi, Malawi BC Corp	3380do			
2100	2200		Malaysia, Radio	7295do			
2100	2200		Namibia, Namibian BC Corp	3270af	3289af		
2100	2200		New Zealand, R New Zealand Int	17675va			
2100	2200		New Zealand, ZLXA	3935do			
2100	2200	vl	Nigeria, Radio/Enugu	6025do			
2100	2200	vl	Nigeria, Radio/Ibadan	6050do			
2100	2200	vl	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do
2100	2200	vl	Nigeria, Radio/Lagos	3326do	4990do		
2100	2156		North Korea, R Pyongyang	6574va	9335va		
2100	2200		Palau, KHBN/Voice of Hope	9985as			
2100	2200	vl	Papua New Guinea, NBC	4890do	9675do		
2100	2156		Romania, R Romania International	11740eu	11940eu	15105eu	15180eu
2100	2200		S Africa, World Beacon	9675af			
2100	2130		Serbia, Radio Yugoslavia	6100eu			
2100	2200		Sierra Leone, Sierra Leone BS	3316do			
2100	2200	vl	Solomon Islands, SIBC	5020do	9545do		
2100	2130		South Korea, R Korea Intl	3970eu	6480eu	15575eu	
2100	2200	as	Spain, R Exterior Espana	9595af	9830eu		
2100	2200	irreg	Sri Lanka, Sri Lanka BC Corp	4940do			
2100	2200	vl	Syria, Radio Damascus	12085eu	13610eu		
2100	2130		Turkey, Voice of	9525as			
2100	2115	mtwhf	UK, BBC World Service	11675ca			
2100	2200		UK, BBC World Service	3255af	3915as	5965as	5975va
				6005af	6190af	6195va	9410eu
				9740pa	11835af	11945as	12095sa
				15400af			
2100	2200	as	UK, Global Kitchen/Merlin	3955eu	6140eu	7325eu	
2100	2200		UK, World Beacon	9675af			
2100	2200		Ukraine, R Ukraine International	5905eu	6020eu	9640eu	11950eu
2100	2200		USA, Armed Forces Network	4278am	6458am	12689am	
2100	2200		USA, KAIJ Dallas TX	13815va			
2100	2200		USA, KTBN Salt Lake City UT	15590na			
2100	2200		USA, KWHR Naalehu HI	17510as			
2100	2130		USA, Voice of America	6035af	6040me	6095me	7375af
				7415af	9535af	9705pa	9760eu
				11870pa	11975af	15185as	15410af
				15445af	15580af	17725af	17735as
				17820as			
2100	2200		USA, WBCQ Monticello ME	7415na			
2100	2200	mtwhf	USA, WBCQ Monticello ME	9330na			
2100	2200		USA, WEWN Birmingham AL	11875na	13615na	15745eu	
2100	2200		USA, WGTG McCaysville GA	12172am			
2100	2200	mtwhf	USA, WGTG McCaysville GA	9400va			
2100	2200		USA, WHRA Greenbush ME	17650af			
2100	2200		USA, WHRI Noblesville IN	5745na	9495sa		
2100	2200		USA, WINB Red Lion PA	13570eu			
2100	2200		USA, WJCR Upton KY	7490va	13594as		
2100	2200	s	USA, WRMI Miami FL	9955am			
2100	2200	a	USA, WRMI Miami FL	7385na			
2100	2200		USA, WRNO New Orleans LA	7395na	15420al		
2100	2200		USA, WSHB Cypress Crk SC	15665eu	18910af		
2100	2200		USA, WTJC Newport NC	9370na			
2100	2200		USA, WWCR Nashville TN	9475na	12160na	13845na	15685na
2100	2145		USA, WYFR Okeechobee FL	15120af	17555eu	17845af	
2100	2200	vl	Vanuatu, Radio	3945do	4960do	7260do	
2100	2200		Zambia, Christian Voice	4965do			
2100	2200	vl	Zambia, National BC Corp	6165do	6265do		
2100	2200	vl	Zimbabwe, Zimbabwe BC Corp	4828do	6045do		
2115	2200		Egypt, Radio Cairo	9990eu			
2115	2130	mtwhf	UK, BBC Caribbean Report	5975ca	11675ca	15390ca	
2115	2130	as	UK, BBC World Service	5975ca			
2130	2200		Albania, R Tirana International	7130eu	9540eu		
2130	2200	vl	Australia, ABC/Alice Springs	4835do			
2130	2200	vl	Australia, ABC/Katherine	5025do			
2130	2200	vl	Australia, ABC/Tennant Creek	4910do			
2130	2200		Australia, Radio	7240pa	9660pa	11880va	12080va
				17715pa	21740va	21740as	
2130	2200		Australia, Radio	7240pa	9660pa	11880va	12080va
				17715pa	21740va		
2130	2200		Austria, R Austria International	5945eu	6155eu	13730af	
2130	2156		China, China Radio International	15110eu	17790eu		
2130	2157		Czech Rep, Radio Prague Intl	11600as	15545af		
2130	2200		Guam, Adventist World Radio	11980as	15550as		
2130	2200		Hungary, Radio Budapest	3975eu			
2130	2200		Iran, VOIRI	11740as	13745as		
2130	2200		South Korea, R Korea Intl	15575eu			
2130	2145	tf	UK, BBC Calling Falklands	11680sa			
2130	2200		USA, Voice of America	6040me	6095me	9535af	9705as
				9760eu	11870pa	15185as	17735as
				17820as			
2130	2200	smtwhf	USA, Voice of America	6035af	7375af	7415af	11975af
				15410af	15445af	15580af	17725af
2130	2200		Uzbekistan, Radio Tashkent	9540eu	9545eu		
2145	2200		USA, WYFR Okeechobee FL	15120af	17845af		

2200

2200	2300		Anguilla, Caribbean Beacon	6090am			
2200	2300	vl	Australia, ABC/Alice Springs	4835do			
2200	2300	vl	Australia, ABC/Katherine	5025do			
2200	2300	vl	Australia, ABC/Tennant Creek	4910do			
2200	2300		Australia, Radio	9660pa	12080va	17715pa	17795va
				21740va			
2200	2300	vl	Cameroon, RTV/Yaounde	4850do			
2200	2300		Canada, CBC Northern Service	9625do			
2200	2300		Canada, CFRX Toronto ON	6070do			
2200	2300		Canada, CFVP Calgary AB	6030do			
2200	2300		Canada, CHNX Halifax NS	6130do			
2200	2300		Canada, CKZN St John's NF	6160do			
2200	2300		Canada, CKZU Vancouver BC	6160do			
2200	2259		Canada, R Canada International	5960am	9755am	13670am	15305am
				17695am	17835as		
2200	2256		China, China Radio International	9880eu			
2200	2300		Costa Rica, R for Peace Intl	15049va	25930al		
2200	2300		Costa Rica, University Network	5030am	6150va	7375na	9725na
				11870va	13749af		
2200	2245		Egypt, Radio Cairo	9990eu			
2200	2300	mtwhf	Eqt Guinea, Radio Africa	15185af			
2200	2300		Germany, Overcomer Ministries	7295eu			
2200	2300	vl	Ghana, Ghana BC Corp	3366do	4915do		
2200	2230		India, All India Radio	7150va	7410eu	9650eu	9910au
				9950eu	11715au		
2200	2225		Iran, VOIRI	11740as	13745as		
2200	2225		Itay, RAI International	9675as	11900as	15240as	
2200	2300		Kenya, Kenya BC Corp	4885do	4915do	4935do	
2200	2300		Kiribati, Radio	9809do	9825do		
2200	2300	vl	Liberia, R Liberia International	5100do			
2200	2210	vl	Malawi, Malawi BC Corp	3380do			
2200	2300		Malaysia, Radio	7295do			
2200	2230		Mexico, R Mexico International	5985am	9705am		
2200	2300		Namibia, Namibian BC Corp	3270af	3289af		
2200	2300		New Zealand, R New Zealand Int	17675va			
2200	2300		New Zealand, ZLXA	3935do			
2200	2300	vl	Nigeria, Radio/Enugu	6025do			
2200	2300	vl	Nigeria, Radio/Ibadan	6050do			
2200	2300	vl	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do
2200	2300	vl	Nigeria, Radio/Lagos	3326do	4990do		
2200	2300		Palau, KHBN/Voice of Hope	9955as	9965as	9985as	
2200	2230	smtwhf	Serbia, Radio Yugoslavia	7230au			
2200	2300		Sierra Leone, Sierra Leone BS	3316do			
2200	2300	vl	Solomon Islands, SIBC	5020do	9545do		
2200	2300	irreg	Sri Lanka, Sri Lanka BC Corp	4940do			
2200	2300		Taiwan, R Taiwan International	11565eu	15600eu		
2200	2300		Turkey, Voice of	7190as	13640as		
2200	2300		UK, BBC World Service	5965as	6175na	6195va	7110as
				9590na	9660as	11835af	11955as
				12080pa	12095sa	15400af	
2200	2300	as	UK, Global Kitchen/Merlin	3955eu	6140eu	7325eu	
2200	2300		USA, Armed Forces Network	4278am	6458am	12689am	
2200	2300		USA, KAIJ Dallas TX	13815va			
2200	2300		USA, KTBN Salt Lake City UT	15590na			
2200	2300		USA, KWHR Naalehu HI	17510as			
2200	2230		USA, Voice of America	7215as	9705as	9770as	11760as
				15185as	15290as	15305as	17735as
				17820as			
2200	2230	mtwhf	USA, Voice of America	6035af	7340af	7375af	7415af
				11975af			
2200	2300		USA, WBCQ Monticello ME	7415na			
2200	2300	mtwhf	USA, WBCQ Monticello ME	9330na			
2200	2300		USA, WEWN Birmingham AL	9385na	9975eu	13615na	
2200	2300		USA, WGTG McCaysville GA	5085va	6890am		
2200	2300		USA, WHRA Greenbush ME	7580af			
2200	2300		USA, WHRI Noblesville IN	5745na	9495sa		
2200	2300		USA, WINB Red Lion PA	13570eu			
2200	2300		USA, WJCR Upton KY	7490va	13594as		
2200	2245	a	USA, WRMI Miami FL	7385na			
2200	2300	s	USA, WRMI Miami FL	9955am			
2200	2300		USA, WRNO New Orleans LA	7395na	15420al		
2200	2300		USA, WSHB Cypress Crk SC	13770eu	15285sa		
2200	2300		USA, WTJC Newport NC	9370na			
2200	2300		USA, WWCR Nashville TN	7435na	9475na	12160na	13845na
2200	2245		USA, WYFR Okeechobee FL	11740na	15120af	17845af	
2200	2300	vl	Vanuatu, Radio	3945do	4960do	7260do	
2200	2210	vl	Zambia, National BC Corp	6165do	6265do		
2230	2300		Canada, R Canada International	5960na	9755na	13670na	
2230	2300		Cuba, Radio Havana	9550am			
2230	2257		Czech Rep, Radio Prague Intl	11600na	15545na		
2230	2300	vl	Papua New Guinea, NBC	9675do	11880do		
2230	2300	vl/as	Solomon Islands, SIBC	5020do			
2230	2300	vl/a	Solomon Islands, SIBC	9545do			
2230	2300		UK, BBC World Service	5965as	5975na	6175na	6195va
				7110as	9590na	9660as	11835af
				11955as	12080pa	12095sa	15400af
2245	2300		India, All India Radio	7410as	9705as	9950as	11620as
				13625as			
2245	2300	smtwhf	USA, WRMI Miami FL	9955am			
2245	2300	a	USA, WRMI Miami FL	7385na			
2245	2300		USA, WYFR Okeechobee FL	11740na			
2245	2300		Vatican City, Vatican Radio	9600as	11830as		

Frequencies

2300	0000		Anguilla, Caribbean Beacon	6090am			
2300	0000	vl	Australia, ABC/Alice Springs	4835do			
2300	0000	vl	Australia, ABC/Katherine	5025do			
2300	0000	vl	Australia, ABC/Tennant Creek	4910do			
2300	0000		Australia, Radio	9660pa	12080va	17715pa	17795va
				21740va			
2300	0000		Bulgaria, Radio	9400na	11700na		
2300	0000	vl	Cameroon, RTV/Yaounde	4850do			
2300	0000		Canada, CBC Northern Service	9625do			
2300	0000		Canada, CFRX Toronto ON	6070do			
2300	0000		Canada, CFVP Calgary AB	6030do			
2300	0000		Canada, CHNX Halifax NS	6130do			
2300	0000		Canada, CKZN St John's NF	6160do			
2300	0000		Canada, CKZU Vancouver BC	6160do			
2300	2330		Canada, R Canada International	5960am	9755am	11895am	13670am
				15305am	17695am		
2300	0000		Costa Rica, R for Peace Intl	15049va	25930al		
2300	0000		Costa Rica, University Network	5030am	6150va	7375na	9725na
				11870va	13749af		
2300	2330		Cuba, Radio Havana	9550am			
2300	0000		Egypt, Radio Cairo	9900am			
2300	0000	a	Finland, YLE/R Finland	11985as	13785as		
2300	2345		Germany, Deutsche Welle	9815as	12055as	13610as	21790as
2300	0000	vl	Ghana, Ghana BC Corp	3366do	4915do		
2300	0000		India, All India Radio	7410as	9705as	9950as	11620as
				13625as			
2300	0000		Kenya, Kenya BC Corp	4885do	4915do	4935do	
2300	0000		Kiribati, Radio	9809do	9825do		
2300	0000	vl	Liberia, R Liberia International	5100do			
2300	0000		Malaysia, Radio	7295do			
2300	0000		Malaysia, RTM Kota Kinabalu	5980do			
2300	2330		Mexico, R Mexico International	5985am	9705am		
2300	0000		Namibia, Namibian BC Corp	3270af	3289af		
2300	2359		New Zealand, R New Zealand Int	17675va			
2300	0000		New Zealand, ZLXA	3935do			
2300	2305	vl	Nigeria, Radio/Enugu	6025do			
2300	2305	vl	Nigeria, Radio/Ibadan	6050do			
2300	2305	vl	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do
2300	2305	vl	Nigeria, Radio/Lagos	3326do	4990do		
2300	0000		Palau, KHBN/Voice of Hope	9965as	9955as	9985as	
2300	0000	vl	Papua New Guinea, NBC	9675do	11880do		
2300	2356		Romania, R Romania International	9690eu	11775na	11830eu	15195na
2300	0000		Sierra Leone, Sierra Leone BS	3316do			
2300	0000	vl/as	Solomon Islands, SIBC	5020do			
2300	0000	vl/a	Solomon Islands, SIBC	9545do			
2300	0000		Sri Lanka, Sri Lanka BC Corp	4940do			
2300	0000		UK, BBC World Service	3915as	5965as	5975na	6035as
				6175na	6195as	7110as	9590na
				11945as	11955as	12095sa	15280as
2300	0000	as	UK, Global Kitchen/Merlin	3955eu	6140eu	7325eu	
2300	0000		USA, Armed Forces Network	4278am	6458am	12689am	
2300	0000		USA, KAIJ Dallas TX	13815va			
2300	0000		USA, KTBN Salt Lake City UT	15590na			
2300	0000		USA, KWHR Naalehu HI	17510as			
2300	2330		USA, VOA Special English	7190as	7200as	9545as	9795as
				11925as			
2300	0000		USA, Voice of America	7215as	9770as	11760as	15185as
				15290as	15305as	17735as	17820as
2300	0000		USA, WBCQ Monticello ME	7415na			
2300	0000	mtwhf	USA, WBCQ Monticello ME	9330na			
2300	0000		USA, WEWN Birmingham AL	9385na	9975eu	13615na	
2300	0000		USA, WGTG McCaysville GA	5085va	6890am		
2300	0000		USA, WHRA Greenbush ME	7580na			
2300	0000		USA, WHRI Noblesville IN	5745na	9495sa		
2300	0000		USA, WINB Red Lion PA	13570am			
2300	0000		USA, WJCR Upton KY	7490va	13594as		
2300	0000	a	USA, WRMI Miami FL	9955am			
2300	0000		USA, WRNO New Orleans LA	7355na			
2300	0000		USA, WSHB Cypress Crk SC	13770eu	15285sa		
2300	0000		USA, WTJC Newport NC	9370na			
2300	0000	as	USA, WWBS Macon GA	11915eu			
2300	0000		USA, WWCR Nashville TN	7435na	9474na	12160na	13845na
2300	2345		USA, WYFR Okeechobee FL	11740na			
2300	0000	vl	Vanuatu, Radio	3945do	4960do	7260do	
2300	2315		Vatican City, Vatican Radio	9600as	11830as		
2330	2356		Belgium, Radio Vlaanderen Intl	15565na			
2330	0000		Canada, R Canada International	5960am	9755am	13670am	
2330	0000	as	Canada, R Canada International	11895am	15305am	17695am	
2330	2345	vl	Libya, Voice of Africa	11815af	15415af	15435va	
2330	0000		Malaysia, RTM Sarawak	7160do			
2330	0000		Netherlands, Radio	6165na	9845na		
2330	0000		USA, VOA Special English	6060as	7190as	7200as	7225as
				7260as	9545as	9795as	11805as
				11925as	13735as	15205as	
2330	2357		Vietnam, Voice of	7145as	12019as		

Selected Programs

Sundays

2300 BBC (am/east as): The World Today. See S 0100.
2300 VOA Washington DC (News Now): VOA News Now Preview.
2301 VOA Washington DC (News Now): World News.
2306 VOA Washington DC (News Now): World News in Depth.
2310 VOA Washington DC (News Now): Regional News.
2314 VOA Washington DC (News Now): USA News.
2318 VOA Washington DC (News Now): Sports.
2322 VOA Washington DC (News Now): Features.
2328 VOA Washington DC (News Now): Station Break.
2330 BBC (am): The Greenfield Collection. This classical music program replaces Ray on Record.
2330 VOA Washington DC (News Now): Preview.
2331 VOA Washington DC (News Now): World News.
2333 VOA Washington DC (News Now): Kaleidoscope.
2358 VOA Washington DC (News Now): Station Break.

Monday-Friday

2300 BBC (am): News. See S 1200.
2300 BBC (east as): The World Today. See S 0100.
2300 VOA Washington DC (News Now): VOA News Now Preview.
2301 VOA Washington DC (News Now): World News.
2305 BBC (am): Outlook. See M 1205.
2306 VOA Washington DC (News Now): World News in Depth.
2310 VOA Washington DC (News Now): Regional News.
2314 VOA Washington DC (News Now): USA News.
2318 VOA Washington DC (News Now): Sports.
2322 VOA Washington DC (News Now): Features.
2328 VOA Washington DC (News Now): Station Break.
2330 VOA Washington DC (News Now): Preview.
2331 VOA Washington DC (News Now): World News.
2336 VOA Washington DC (News Now): Dateline.
2345 VOA Washington DC (News Now): Science/Medicine/Environment.
2349 VOA Washington DC (News Now): Business and Economic News.
2353 VOA Washington DC (News Now): Women's Business Minute.
2354 VOA Washington DC (News Now): Feature.
2358 VOA Washington DC (News Now): Station Break.

Mondays

2345 BBC (am): Patterns of Faith. See M 1245.

Tuesdays

2345 BBC (am): Plain English. See M 1230.

Wednesdays

2345 BBC (am): Heart and Soul. See T 1230.

Thursdays

345 BBC (am): Best of the Edge. See W 1230.

Fridays

2330 BBC (east as): Global Business. See S 0430.
2345 BBC (am): Body and Mind. See T 0330.

Saturdays

2300 BBC (am): News Summary. See S 1100.
2300 BBC (east as): The World Today. See S 0100.
2300 VOA Washington DC (News Now): VOA News Now Preview.
2301 BBC (am): Play of the Week. See S 0530.
2301 VOA Washington DC (News Now): World News.
2306 VOA Washington DC (News Now): World News in Depth.
2310 VOA Washington DC (News Now): Regional News.
2314 VOA Washington DC (News Now): USA News.
2318 VOA Washington DC (News Now): Sports.
2322 VOA Washington DC (News Now): Features.
2328 VOA Washington DC (News Now): Station Break.
2330 VOA Washington DC (News Now): Preview.
2331 VOA Washington DC (News Now): World News.
2333 VOA Washington DC (News Now): Our World.
2358 VOA Washington DC (News Now): Station Break.
2330 BBC (east as): Arts in Action. See S 0030.

Thank You ...

Additional Contributors to This Month's Shortwave Guide:

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PROPAGATION CONDITIONS, U.S.

OPTIMIZE YOUR MONITORING

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How To Use This Table

The *Monitoring Times* propagation table is set up to cover three main areas of the continental US and similar circuits are calculated for each area. If you live in Canada or along the 49th parallel, and have access to the Internet, you can check the following sites for similar tables for the Canadian and northern US users at **http://www.odxa.on.ca/rac2txt99.htm**.

In the *MT* tables and on the Canadian web site, the OWF (Optimum Working Frequency) frequency for a particular circuit is displayed. This frequency should give you the best chance, 90% of the time, to hear a station located at the other end of the circuit. If you feel adventurous, look up higher than the OWF for possible signals.

The tabulated OWF is approximately equivalent to 80% of the MUF (Maximum Usable Frequency) so you could still go up in frequency in your search for a signal. For example, if the tabulated OWF is 8.0 MHz, the MUF would be 10 MHz, so you could go lurking in the upper reaches up to 10 MHz. When you reach the MUF, your chances of hearing a good signal have now decreased to about 10%. When the solar activity is high you might find some of the MUF in the 35 to 45 MHz area; you never know what you can find "up there."

The OWF can, at times, have a calculated value of "0". This value is replaced by an asterisk (*) and the cells are shaded in the *Monitoring Times* chart and on the Web pages. When you see this, do not despair; keep on looking in the vicinity of the last frequency listed for that circuit. The reason why the OWF can have a calculated value of "0" is simply that the ALF (Absorption Frequency) on this circuit, at that particular time of day, is higher than the OWF and, in theory, communication at the OWF should be impossible. But I have been in the radio field long enough to know that theory and practice do not always agree!

As it is relatively safe to assume reciprocity in the forecasts most of the time, the *MT* circuits are labeled "TO/FROM." There are some technical arguments against this assumption, but we know that the *MT* forecasts have been used with success by overseas listeners to listen to North American broadcasts.

A "P" after the name of a circuit indicates that the signal on that particular circuit can be influenced by auroral zone disturbances while traveling over the pole.

Enjoy DXing and use the propagation charts to help you locate unusual signals.

OPTIMUM WORKING FREQUENCIES (MHz)

For the Period 15 June 2000 to 14 July 2000 Flux=194 SSN=150

Predictions prepared using ASAPS for Windows®

UTC	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
TO/FROM US WEST COAST																								
CARIBBEAN	15	16	17	17	16	14	13	12	12	11	10	10	11	12	14	16	17	18	19	19	19	18	18	17
SOUTH AMERICA	19	20	21	22	19	17	16	15	15	14	14	14	14	17	20	22	23	23	23	24	24	24	23	20
WESTERN EUROPE	12	11	11	10	11	11	12	11	*	*	*	*	*	*	14	16	17	16	17	17	16	15	14	13
EASTERN EUROPE (P)	12	12	12	13	14	15	13	*	*	*	*	*	*	*	13	15	16	17	17	16	16	14	*	*
NORTH AFRICA	19	18	17	17	17	15	14	12	*	*	*	*	*	*	15	17	17	18	19	19	19	19	19	19
CENTRAL AFRICA	19	19	19	18	17	15	13	*	*	*	*	*	*	*	17	18	20	21	21	21	21	21	20	18
SOUTH AFRICA	21	19	16	13	11	15	14	14	13	*	*	*	*	15	17	19	20	21	21	22	21	21	20	20
MIDDLE EAST (P)	16	16	18	19	18	16	14	*	*	*	*	*	*	*	15	17	18	20	20	20	19	18	18	17
CENTRAL ASIA (P)	18	19	19	20	19	18	16	*	*	*	*	*	11	12	13	15	16	17	16	16	16	15	15	17
INDIA (P)	19	19	19	20	19	18	16	*	*	*	*	*	11	11	13	15	17	19	20	21	21	19	18	18
THAILAND	20	20	20	21	20	18	17	15	*	*	12	12	11	12	13	14	17	18	20	21	21	19	19	20
AUSTRALIA	25	24	24	25	25	22	20	18	16	15	15	14	14	13	14	16	18	15	*	*	*	17	23	24
CHINA	19	19	20	20	20	18	17	15	13	12	12	11	11	11	12	14	15	16	16	16	16	17	18	19
JAPAN	18	18	18	19	19	17	15	14	12	12	11	11	11	11	11	13	15	15	14	16	18	19	19	19
SOUTH PACIFIC	23	23	24	23	22	19	18	16	15	14	14	13	12	12	13	15	14	17	21	22	23	24	24	24
TO/FROM US MIDWEST																								
CARIBBEAN	21	20	18	17	15	14	14	14	13	12	12	13	16	18	20	20	21	21	22	22	21	21	21	21
SOUTH AMERICA	23	24	24	22	21	19	19	19	18	17	16	17	20	24	26	27	27	27	27	27	27	27	26	24
WESTERN EUROPE	14	13	12	12	12	12	13	12	12	*	*	*	14	16	17	18	18	17	18	18	18	17	16	15
EASTERN EUROPE (P)	12	11	11	12	13	12	12	*	*	*	*	*	13	15	17	18	19	19	19	18	17	15	13	12
NORTH AFRICA	18	18	18	16	15	13	12	*	*	*	*	*	14	16	17	17	18	19	19	19	19	19	18	19
CENTRAL AFRICA	22	22	20	18	16	15	14	13	*	*	*	15	16	17	18	19	20	20	21	21	21	21	21	22
SOUTH AFRICA	22	19	16	13	11	14	16	15	14	*	*	15	17	18	20	21	21	22	22	21	21	21	21	23
MIDDLE EAST	17	17	17	17	15	14	*	*	*	*	*	*	14	16	17	18	18	19	19	19	19	19	18	18
CENTRAL ASIA (P)	18	19	18	17	16	15	*	*	*	*	*	12	14	15	16	17	18	17	17	17	16	15	15	16
INDIA	18	19	18	17	16	*	*	*	*	*	*	*	13	15	17	19	20	20	21	21	21	20	18	18
THAILAND	18	19	19	18	17	15	*	*	*	*	*	11	12	13	16	18	19	20	21	21	21	19	19	18
AUSTRALIA	23	22	23	22	20	18	16	15	14	14	13	13	13	14	15	17	18	15	*	*	*	17	22	22
CHINA (P)	19	19	19	18	17	15	*	*	*	*	11	11	12	14	15	17	17	17	17	16	15	16	18	19
JAPAN	18	19	19	19	17	15	13	12	12	11	11	11	11	12	14	15	15	15	15	16	18	18	19	19
SOUTH PACIFIC	24	24	25	23	20	18	16	15	15	15	14	14	13	15	19	17	16	20	23	24	25	25	25	24
TO/FROM US EAST COAST																								
CARIBBEAN	15	14	13	12	12	11	11	10	10	9	9	11	14	15	16	16	16	17	17	17	16	16	15	16
SOUTH AMERICA	21	22	22	21	21	20	20	18	16	14	15	19	24	25	26	26	25	24	24	25	25	24	23	21
WESTERN EUROPE	14	13	13	12	12	12	13	13	12	13	14	16	17	18	18	19	18	18	19	19	19	18	17	15
EASTERN EUROPE	12	12	11	11	13	13	12	11	*	*	13	14	16	17	18	18	18	19	19	18	17	15	13	12
NORTH AFRICA	18	18	18	17	15	14	14	13	13	13	15	16	17	18	19	20	20	20	20	20	20	20	19	18
CENTRAL AFRICA	23	22	19	18	17	16	16	15	14	15	17	18	20	20	21	21	22	22	22	23	23	22	23	23
SOUTH AFRICA	21	18	15	13	10	14	17	16	15	16	19	22	24	25	25	25	26	26	26	26	25	25	25	23
MIDDLE EAST	18	17	17	16	15	14	13	*	*	*	15	16	17	18	19	20	20	20	20	20	20	20	19	19
CENTRAL ASIA (P)	17	19	18	16	15	14	*	*	*	*	14	15	17	18	18	19	19	19	18	18	17	16	15	15
INDIA (P)	19	19	18	15	14	*	*	*	*	*	*	14	17	19	20	21	21	21	21	21	20	19	19	18
THAILAND (P)	19	19	18	16	*	*	*	*	*	*	*	14	16	18	19	20	21	21	21	21	20	19	18	19
AUSTRALIA	23	23	22	20	18	16	15	15	15	14	14	14	15	17	18	18	17	15	*	*	*	17	22	22
CHINA (P)	19	19	18	16	14	*	*	*	*	*	12	13	15	18	19	19	18	17	16	15	15	15	17	19
JAPAN	20	20	19	18	16	15	13	13	12	12	12	13	14	16	16	16	16	16	16	17	18	19	19	20
SOUTH PACIFIC	26	26	24	21	20	18	17	17	17	16	15	15	18	22	20	18	18	24	27	27	27	*	*	*

* ***Unfavorable conditions: Search around the last listed frequency for activity.***

(P) denotes circuit across polar auroral zone; reception may be poor during ionospheric disturbances.

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The BBC (Yes, Again!)

Lately, a good deal of space in this column, as well as in other forums, has been filled with discussion about the ***BBC World Service***. Perhaps that is as it should be, given the commanding position "Aunty" has held in the fields of both public service and international broadcasting for so many years. It is perhaps an unfortunate sign-of-the-times that much of this discourse has centered around a worry that the ***BBC*** is displaying a willingness to embrace lesser values in pursuit of more pedestrian objectives and, in the process, surrendering that traditional high ground.

So, it is a deep appreciation – and even some reverence – for the ***BBC***, rather than disdain, that is driving these discussions. The round of changes implemented by the ***World Service*** beginning on April 3 has only served to reinvigorate the debates.

What is it that listeners want from the ***BBC***? I dare say that this is the question which is being asked by those driving these changes, as much as it is being asked by the listeners themselves. If nothing else, the April 3 changes are a rather bold and decisive attempt to respond to these queries. In the early going, it appears to this observer (despite all the misgivings I expressed in the March column) that there is a measure of success evident in the outcome. However, there remain a number of serious problems and concerns as well.

❖ The Positives

The scheduling of ***World Service*** programming is much better organized than it has been for some time. The use of the classifiers "World Living," "World Showcase" and "World Insight" as broad umbrellas under which regular and feature programming of similar subject matter are placed, has proven helpful. This practice provides a means of reserving the same time each day for the same kind of programming. It also simplifies and adds some needed transparent logic to the layout of *BBC On-Air*, the service's program guide magazine.

As an example, a range of science series are arrayed across the week under the "World Insight" brand at the same time each day. This aids avid listeners of science-based programs in finding and hearing what is of keen interest to them. This example is replicated with other types of programming – arts/cultural, music, literature, human interest, etc.

The new custom of concentrating news and current affairs programming around meal times and freeing time in-between for information and entertainment series features also works well in practice, especially for North American listeners. It makes it possible once again to tune into the World Service and remain with it for hours at a time without hearing lengthy, repetitive news reports.

❖ Where the Jury is Still Out

It remains to be seen whether strong and diverse feature programming, on which the ***BBC*** built its reputation as a *full service* broadcaster, grows and flourishes within this new format or withers and dies. With the new schedules, one gets the nagging suspicion that the "product line" is a little thinner than in the past.

This impression is somewhat reinforced by the BBC's cancellation of some specialist programs and the merging of that content into more generalist titles (such as when "The Farming World," a 40 year ***World Service*** mainstay, was canceled and its content merged into "Global Concerns," an environmental program). However, new ***BBC*** Director General Greg Dyke has expressed a strong commitment to improving and increasing programming content. It will be interesting to observe how, if at all, this will affect the ***World Service***.

In addition, the decision to base listings in *BBC On-Air* on local times within the seven shortwave streams is, at best, a mixed bag. It is manageable, and even useful, if one wishes to listen only to the program stream intended for one's own geographic region. However, as we all know, shortwave, unlike satellite, transmissions do not stay within a defined "footprint." The use of seven different local times is quite cumbersome when one is attempting to determine what can be heard via other streams.

Also, the ***BBC*** has promised that this group of changes is the last in a carefully crafted series and that there will be a much higher degree of stability and predictability from here on in. Only time will tell.

❖ Needed Corrections

As expressed in March, though, the move to this many streams has introduced a significantly higher degree of complexity to the tasks of transmitter coordination and program continuity. In point of fact, this new plan is much more complex than simply a set of independent streams. In practice it is more of a *weaving* of content, whereby transmissions to the different geographical regions are joined and separated in various configurations at various times of the day.

The challenges posed by this complexity have been evident in the early weeks of the plan's implementation. More than once, the programming actually transmitted to a region has been that scheduled for another region.

Furthermore, without reference to *BBC On-Air* or other schedule reference material, it is impossible for the listener to conclusively determine the stream to which he or she is tuned – and even with *BBC On-Air* it is not easy. This can and should be addressed by the ***BBC*** providing regular on-air identifications for each stream.

Other serious problems persist from the old regime. Transmitter and frequency switches are often made before a program ends, and sometimes in mid-program *by schedule*. Usually, no announcements are made to warn that a switch is coming; nor are listeners given direction to a new frequency. This, at one time, was *de rigeur* at the ***BBC*** and seen as a hallmark of professionalism.

In sum, there remains a yawning need for improved coordination between the program continuity and transmission arms of the ***World Service*** that must be addressed. Anything less bespeaks a disrespect for the listening audience that mars the service in a way that all other attempts at improvement will never be able to overcome.

Until July, good listening!

Hauser's Highlights

ROMANIA: Radio Romania Int'l
RRI A-00 includes English:

0200-0300	AsAuAm	9570 11885 11940 15105 15380 17790
0400-0500	AsAm	11940 15105 15335 17745
0600-0700	Am	11940 15335
0641-0656	Eu	9570 9665 11885 15250
0700-0800	Af	15580 17735
1300-1400	EuAm	15250 15390 17770 17790
1700-1800	Eu	15250 15390 17735 17805
2100-2200	Eu	11740 11940 15105 15180
2300-2359	EuAm	9690 11775 11830 15105

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Ireland on the Internet

This is another column in our series about Internet Broadcasting. This edition focuses on the stations that broadcast over the Internet from the Emerald Isle – both the country of Ireland and Northern Ireland that is part of the United Kingdom.

❖ Everyone's Irish on St. Patrick's Day

Are you Irish? Do you have any Irish blood in you? The chances are quite good that you do. The nineteenth century saw a flood of immigration to the shores of America. The Irish potato famine brought about the first great wave of new Irish settlers, but that was only the start. They continued to come through Ellis Island and other ports such as Galveston, Texas. They came in such numbers that the State of New Jersey, in the State censuses of 1885 and 1895, had a special column to be checked if the individual being counted was Irish.

The Irish who came here, for the most part, were a hardy people of the sod. At home in Ireland, many planted their land in the spring and then worked in the factories of the nearby cities during the growing season. They were an industrious people who helped to make our country what it is today. The Irish not only settled in the great cities of New York and Boston, they were also pioneers who moved westward during the great expansion of the United States.

The Irish people of today are far better off than their ancestors. The Irish economy is booming, thanks to the infusion of high-tech industries. Culturally, things are much the same. Irish music, song and dance are still very popular, as it has become here in the United States, thanks to the recent popularity of Irish dance. That very culture is available to you at your convenience by way of Internet radio. So, let's talk about it.

❖ National Radio

Ireland's national public radio service, known as Radio Telefis Éireann (RTÉ), was formed in 1926 and now consists of five radio channels employing 1,934 people:

RTÉ Radio 1 is the flagship radio channel broadcasting a mixture of speech and music, news and information, as well as a host of drama, variety and features programming. This is the station that you hear in live streaming RealAudio six hours a day via World Radio Network (WRN) and 24 hours from the Radio 1 web site (***www.rte.ie***/). Radio 1's programs are completely indexed by local time on the Aertel web site (***www.rte.ie/aertel/P185.HTM***).

Raidió na Gaeltachta was established in 1972 for the Irish-speaking people of Gaeltacht and around the country. It broadcasts between 06:30 and 23:00 local time and is streamed live.

2FM arrived on the airwaves in 1979 to meet a growing need of younger generation music fans. 2FM is heard nationally on both FM and AM and is streamed live on the 2FM web site (***www.rte.ie/2fm***/). The Aertel web site (***www.rte.ie/aertel/P186.HTM***) provides a day-by-day program guide.

Lyric FM, formerly called FM3, was launched last year (www.lyricfm.ie/). It opened up the sound of classical music to a massive audience around the country and beyond with live streaming from 0800-2000 UTC. For detailed programming, consult Aertel (***www.rte.ie/aertel/P187.HTM***)

Radio One World is RTÉ's multicultural channel created as a service to the many new communities in Ireland with programs in Albanian, Bosnian, Romanian, Polish, Nigerian, Indian, Chinese, and Vietnamese. This is the only RTÉ channel that is not on the Internet.

❖ Commercial Radio

Irish radio stations are licensed by the Independent Radio and Television Commission (IRTC). Radio stations are categorized as National Independent Commercial, Local Independent Commercial, Community Radio, Hospitals and Institutions, and Special Interest. Visit the web sites of these stations to access their on-line broadcasts:

XFM has been broadcasting on 107.9 FM to Dublin city and surrounding areas since 1991 as an alternative radio station to the mainstream and top 40. Program types are mostly new music. (***www.isis.ie/xfm***/)

FM104. Dublin's news, talk radio, and top 40 music station. (***www.fm104.ie***/)

98FM. Dublin's "Sound of the City" uses a format of hits, news, and entertainment. The wider your bandwith, the better the sound. (***www.98fm.ie***/)

Clare FM. County Clare's stereo signal pumps out traditional music and culture to their region of the west coast of Ireland. (***www.clarefm.ie***/)

Galway Bay FM provides an experimental RealAudio stream. (***www.wombat.ie/gbfm***/)

❖ Northern Ireland

Northern Ireland, as part of the United Kingdom, is primarily served over the airwaves by BBC Ulster. BBC is on line, of course, from London. Irish stations also are heard well. Several Northern Ireland commercial stations that are streamed live:

Downtown Radio - Transmits mostly pop music for the folks in Belfast. (***www.downtown.co.uk***/)

Cool FM - A sister station of Downtown Radio transmitting high quality contemporary rock/pop music. (***www.coolfm.co.uk***/)

Belfast CityBeat - Offers music and requests. (***www.citybeat.co.uk***/)

❖ Rebroadcasting

RTÉ Radio One (***www.rte.ie/***) provides World Radio Network (WRN) with six hours of programming each day, two of which are retransmitted via satellite and four of which can be heard in RealAudio via WRN1 to North America (all times UTC):

0400 - "The Irish Collection" - A late-night service with selected highlights from the previous day's RTÉ schedule, news and sport, music, documentaries, and drama.

1200 - "The News at One" - 45 minutes of Irish news with live interviews and reports (Mon-Sat).

1200 - "This Week" - A review of the significant events of the week (Sundays).

1245 - "Liveline" - The first 15 minutes of Marian Finucane's afternoon chat show (Mon-Sat).

1730 - "News and Business News" - A half-hour news roundup.

2100 - "Tonight with Vincent Browne" - A late night discussion and phone-in program with a strong, loyal listenership.

❖ Irish Radio Resources

Several web sites offer links to Irish and Northern Ireland radio stations broadcasting on the Internet:

Aertel - RTÉ's Teletext Service (***www.rte.ie/aertel/index.html***)
BRS Media International (***www.web-radio.fm/in_list.html***)
Independent Radio & Television Commision (***www.irtc.ie/stations.htm***)
Media UK Internet Directory (***www.mediauk.com/directory/radio/index.html***)
Radio Directory (***www.radiodirectory.com/Stations/Europe/Ireland/index.html***)
The Northern Ireland Site (***www.thenisite.com***/)
World Radio Network (***www.wrn.org***)

❖ Summary

There are many regional commerical stations in Ireland, but most of them are not yet on line. They may not have found the need to venture beyond their listening area. Nevertheless, the stations which can be heard in RealAudio offer a wide variety of material. If music is your forté, then you have the classical, the pop, the rock, and the traditional Irish. The talk and call-in shows on RTÉ Radio One are fascinating to hear and will give you an up-to-date insight into the culture of Ireland and the everyday life of its people.

One of the best reasons for listening to Irish radio is that broadcasts are in English. A thick Irish brogue may sometimes give you difficulty, but you generally will have no trouble understanding the language.

Single Channel Per Carrier (SCPC) Services

By Robert Smathers, roberts@nmia.com

An SCPC transmitted signal is transmitted with its own carrier, thus eliminating the need for a video carrier to be present. Dozens of SCPC signals can be transmitted on a single transponder. In addtion to a standard TVRO satellite system, an additional receiver is required to receive SCPC signals.

The frequency in the first column is the 1st IF (typical LNB frequency) and the second column frequency (in parentheses) is the 2nd IF (commercial receiver readout) for the SCPC listing. Both frequencies are in MHz.

GE-2 Transponder-Vertical 13 (C-band)

1178.70 (81.3) NASA space shuttle audio (missions only)

Galaxy 4R Transponder 1-Horizontal (C-band)

1443.80 (56.2) Voice of Free China (International Shortwave Broacaster) Taipei, Taiwan
1443.60 (56.4) KBLA-AM (1580) Santa Monica, CA–*Radio Korea*
1438.30 (61.7) WWRV-AM (1330) New York, NY–Spanish religious programming and music, ID–*Radio Vision Christiana de Internacional*

Galaxy 4R Transponder 3-Horizontal (C-band)

1404.60 (55.4) WGN-AM (720) Chicago, IL–news and talk radio/Cubs MLB radio network
1404.40 (55.6) WMVP-AM (1000) Chicago, IL–"ESPN Radio 1000"/White Sox MLB radio network
1404.20 (55.8) Tribune Radio Networks/Wisconsin Radio Network
1402.90 (57.1) USA Radio Network
1402.70 (57.3) WLAC-AM (1510) Nashville, TN–news and talk
1402.20 (57.8) NorthWest Ag News Network - Agriculture info for the Pacific Northwest
1402.00 (58.0) Occasional Audio
1401.80 (58.2) People's Radio Network
1399.00 (61.0) Sports Byline USA/Sports Byline Weekend
1398.80 (61.2) Talk Radio Network (TRN)
1398.50 (61.5) Occasional audio
1397.80 (62.2) Occasional audio
1397.50 (62.5) Minnesota Talking Book Radio Network–reading service for the blind
1397.10 (62.9) Wisconsin Radio Network
1396.90 (63.1) White Sox MLB radio network
1396.70 (63.3) Radio America Network
1395.80 (64.2) WTMJ-AM (620) Milwaukee, WI–talk radio/Brewers MLB radio network
1395.40 (64.6) Michigan News Network–network news feeds/WPLT-FM (96.3) Detroit
1395.00 (65.0) Occasional audio
1394.70 (65.3) WJR-AM (760) Detroit, MI–news and talk radio/Michigan News Network/Tigers MLB radio network
1394.30 (65.7) Michigan News Network – network news feeds
1383.10 (76.9) KIRO-AM (710) Seattle, WA–news and talk radio/Mariners MLB radio network
1382.60 (77.4) Soldiers Radio Satellite (SRS) network–U.S. Army information and entertainment radio
1382.30 (77.7) Motor Racing Network (occasional audio) NASCAR racing
1382.00 (78.0) Occasional audio
1381.60 (78.4) KEX-AM (1190) Portland, OR–news and talk radio
1381.40 (78.6) Occasional audio
1381.20 (78.8) KJR-AM (950) Seattle, WA– sports talk radio
1380.90 (79.1) Occasional audio
1377.10 (82.9) In-Touch–reading service
1376.00 (84.0) Kansas Audio Reader Network–reading service

Anik E2 Transponder 1-Horizontal (C-band)

1446.00 (54.0) Canadian Broadcasting Corporation (CBC) Radio–North (Quebec) service

Anik E2 Transponder 5-Horizontal (C-band)

1366.00 (54.0) Canadian Broadcasting Corporation (CBC) Radio–North (Eastern Arctic) service

Anik E2 Transponder 7-Horizontal (C-band)

1326.00 (66.0) Canadian Broadcasting Corporation (CBC) Radio–North (MacKenzie) service
1325.50 (65.5) Canadian Broadcasting Corporation (CBS) Radio–Occasional feeds/events

Anik E2 Transponder 17-Horizontal (C-band)

1126.00 (54.0) Canadian Broadcasting Corporation (CBC) Radio–North (Western Arctic) service
1125.50 (54.5) Canadian Broadcasting Corporation (CBC) Radio–North (Newfoundland and Labrador) service

Anik E2 Transponder 23-Horizontal (C-band)

1006.00 (54.0) Societe Radio-Canada (SRC) Radio–AM Network
1005.50 (54.5) Canadian Broadcasting Corporation (CBC) Radio-North (Yukon) service

Solidaridad 1 Transponder 1-Vertical (C-band)

1447.90 (52.1) Antenna Radio/Antenna Radio Noticias
1447.60 (52.4) Antenna Radio/Antenna Radio Noticias
1447.20 (52.8) La Grande Cadena Raza

Anik E1 Transponder 21-Horizontal (C-band)

1036.70 (63.3) Wal-Mart In-store music
1037.00 (63.0) Wal-Mart In-store music
1037.50 (62.5) Wal-Mart In-store music

Galaxy 10R Transponder 4 (Ku-band)

1012.75 (87.25) Wal-Mart In-store network

1013.15 (86.85) Sam's Club In-store network
1013.50 (86.50) Wal-Mart In-store network
1013.95 (86.05) Wal-Mart In-store network
1014.25 (85.75) Sam's Club In-store network
1014.75 (85.25) Wal-Mart In-store network
1015.05 (84.95) Wal-Mart In-store network

RCA C5 Transponder 3-Vertical (C-band)

1404.60 (55.4) Wyoming News Network/Northern Ag Network
1400.60 (59.4) Learfield Communications
1400.40 (59.6) Learfield Communications/MissouriNet
1400.20 (59.8) Learfield Communications
1400.00 (60.0) Learfield Communications
1396.60 (63.4) Kansas Information Network/Kansas Agnet–network news feeds
1396.40 (63.6) Liberty Works Radio Network
1396.20 (63.8) MissouriNet/Cardinals MLB radio network
1395.90 (64.1) Western Montana Radio Network/Red River Farm Network
1395.70 (64.3) MissouriNet/Royals MLB radio network
1386.40 (73.6) Learfield Communications
1386.20 (73.8) Radio Iowa
1384.60 (75.4) Capitol Radio Network
1384.00 (76.0) Capitol Radio Network
1383.80 (76.2) Learfield Communications
1383.40 (76.6) Capitol Radio Network
1382.90 (77.1) MissouriNet
1382.50 (77.5) Virginia News Network–network news feeds/
1382.10 (77.9) Learfield Communications/MissouriNet

SATELLITE LOADING REPORT OF THE MONTH:

Telstar 6 at 93 degrees West longitude

C-band		Ku-band	
1	Occasional video	11728.5 V	CBS Newsnet (digital)/CBS SNG (digital)
2	Occasional video		
	Occasional video	11735.0 H	Data Transmissions
4	Occasional video	11789.5 V	CBS SNG (digital)
5	FOX feeds (analog/digital)	11796.0 H	Occasional video
6	WB Network/Warner Brothers Domestic TV Distribution	11836.0 V	Occasional video
		11842.5 H	Data Transmissions
7	Occasional video	11867.0 V	Occasional video
8	Occasional video	11873.5 H	Occasional video
9	Occasional video	11898.0 V	Occasional video
10	FOX News Edge	11904.5 H	Occasional video
11	Occasional video	11929.0 V	Occasional video
12	Occasional video	11935.5 H	Occasional video
13	FOX West (LEITCH)	11960.0 V	Occasional video
14	Occasional video	11966.5 H	Occasional video
15	Occasional video	11991.0 V	Data Transmissions
16	Occasional video	11997.5 H	Occasional video
17	FOX feeds	12022.0 V	Occasional video
18	CBS (analog/digital)	12028.5 H	Data Transmissions
19	CBS (analog/digital)	12053.0 V	Occasional video
20	CBS (analog/digital)	12059.5 H	Occasional video
21	CBS East (LEITCH)	12084.0 V	Occasional video
22	CBS (analog/digital)	12090.5 H	Data Transmissions
23	CBS West (LEITCH)	12115.0 V	Occasional video
24	CBS feeds/Occasional video	12121.5 H	Data Transmissions
		12146.0 V	Occasional video
		12152.5 H	Occasional video
		12177.0 V	Data Transmissions
		12183.5 H	Data Transmissions

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Satellite TV DXing for Tight Spaces and Budgets

In the April 2000 issue of *MT* I did an article about antennas and the law which prompted me to think about the possibilities of satellite TV DXing within the parameters of the size of dish allowed under FCC rules. For those not up to speed on the rules here's a brief sketch: Section 207 of the Telecommunications Act of 1996 prohibits state and local laws that restrict the installation, maintenance or use of antennas to receive video programming. These include Direct-to-Home satellite dishes that are under one meter in diameter. The rule includes people living in detached houses, town houses, condominiums, or mobile home parks regardless of whether the consumer owns or rents. Now, of course, FCC rules are irrelevant in locations in which there are no restrictions on any type of video reception.

With that in mind I went looking for a dish which would fit the bill. What I needed was an inexpensive, well designed, high performance dish under 39". After looking in the usual places I found the 76 cm dish offered by smallear.com. What I liked in this dish was the solid one-piece reflector, the sturdy Azimuth/Elevation mount, and the price: $100 (plus $25 S&H). This price is for the unit when sold as a "combo," which includes a .6 dB Ku-band LNBF, 60 feet of lead-in cable and a 4' cable to go from your satellite receiver to your TV set. You'd be hard pressed to find a good Ku-band LNB at that price, let alone the dish and all cables!

❖ EZ AZ/EL!

Assembling the 76 cm offset dish is very easy thanks to the fact that parts are kept to a minimum with just the solid reflector, the offset arm, and the Azimuth/Elevation (AZ/EL) mount to assemble. A single instruction sheet is packed with the dish showing an exploded view of the dish as well as a parts list. I found that assembling the dish took a little over an hour with a minimum of confusion on my part. The unit is packaged in one flat box with a shipping weight of 28 pounds.

The thing about an AZ/EL mount is that, unlike a polar mount, it does not track the equatorial arc on which all the satellites are parked. The dish must be aligned in the Azimuth, the direction East and West, and Elevation, the direction up and down, for each satellite you wish to see. Once you get it lined up properly, simply tighten the mount bolts. This type of mount is mainly used for installations where only one satellite is to be viewed. Still, this doesn't mean it can't be used for budget satellite TV DXing. Unfortunately, it just won't have the convenience of a motorized mount triggered from the friendly confines of your recliner.

The 76 cm offset-fed dish looking at transponder 4 of SBS4, an antique satellite launched in August of 1984 and now in inclined orbit at 77°W. The 76 cm "dish-combo" comes with a .6 dB Ku-band LNBF, 60' lead-in coax and 4' of coax to go from your receiver to your TV set.

If you're installing this dish on an exterior wall make sure it faces south with no obstructions (trees, buildings, etc.) in between the dish and the satellite you're trying to receive. If you're planning a roof installation take extreme caution. I don't recommend roof installations because of the inherent danger involved in crawling around on steep slopes and high places. There's also the inconvenience in re-aiming the dish to consider. The design of the mount of this dish requires three anchor points for stability, thereby ruling out mounting it on a single post.

❖ Finding a Receiver

I used an old General Instrument analog C/Ku-band receiver of 15 year old vintage and it did an excellent job with Ku-band signals from this antenna. You can use any analog receiver provided it has Ku-band reception capability. If you don't have one or can't find one, smallear.com sells a very inexpensive analog receiver to go along with the "dish combo" and the whole system is $159 plus $25 S & H. That's an amazing price for a complete satellite system capable of tuning in the entire Ku-band. I haven't used the analog receiver offered by smallear.com, but from what's written it seems to be a bare minimum receiver. They have "upgrades" with more features, but to get started this receiver will probably suffice. Good results might also be had with a cheap, used receiver from a hamfest.

You can use an MPEGII digital receiver with this antenna to pick up the dozens of digital "Free-to-Air" channels broadcast on many Ku-band satellites. In fact, this system is really designed for single satellite reception. Thousands of these systems are sold every month to downlink ethnic programming to audiences who are left out of most local programming line-ups.

❖ What You'll See

One of the most common uses of this system is to pick up CCTV 4 which is a channel from China Central Television, Beijing, China. This is the international service of CCTV with many hours a day of English programming and provides an interesting look into daily life in China today. This analog service is found on Galaxy 3R (95°W) channel 24.

Among the other analog services found are numerous sports back hauls and feeds on SBS 6 at 74° W. There's no schedule of what will be transmitted when, but, a few weeks of monitoring this satellite will give you and good idea of what's happening. NBC has a number of time zone feeds for its network on GE 1 at 103°W,

The smallear.com 76 cm offset-fed dish is designed to be installed on a wall or roof. Here it's set up for experimental purposes on a deck with a 15" TV set and ancient General Instrument analog satellite receiver to show relative size and picture actually coming from SBS 6 74° W.

and, throughout the year you'll find many analog sports feeds can be found on GE 5 at 79°W.

Among the digital services found in the MPEGII FTA format are four PBS feeds including PBS East, PBS You, PBS X (the national feed) and PBS Kids on GE 3 at 87°W; Sky Angel home schooling channel, Chinese programming from Taipei; and ethnic programming from Saudi Arabia, Thailand, Kuwait, and Syria are all found on Telstar 5 at 97°W.

Close-up of Azimuth/Elevation mount for easy adjustment. The design of this antenna/mount is elegantly simple but well built and very easy to assemble.

If you have a 4DTV DigiCipherII receiver from General Instrument you'll find even more programming on the Ku-band. Look for South Carolina Educational TV with several channels as well as Louisiana Public Broadcasting on Telstar 4 at 89°W; PBS X, The Annenberg/CPB Channel and PBS HDTV broadcasts can be found on GE 3 at 87°W.

Unlike C-band transmissions there are no audio subcarriers which can be tuned in. Ku-band is mostly a workhorse band used for news, sports and some network feeds. The subscription music service DMX, which transmits over 100 channels of commercial-free digital music formats can be found on the Ku-band side of T4. While the 76cm dish would do an excellent job of tuning in the signal, their special DMX receiver is needed to get the programming. Still, if you have a DMX receiver, setting up the 76cm dish as a stand-alone system would free up the big dish for the rest of the family to watch their favorite shows.

❖ Small Dish Limitations

Even though this dish works well in the Ku-band, it does have its limitations. First, forget about replacing the Ku-band LNBF with a C-band LNBF, there's just not enough gain with a 76cm dish at C-band frequencies to pick up satisfactory analog signals let alone digital ones. Second, it will not do very well on weaker satellites and ones in inclined orbits.

Setting this dish up for what it was designed to do, look at one satellite in the Ku-band will give excellent results. Using it to scan the skies because of its lack of polar mount makes it an outdoor activity.

And, finally, don't bother trying to hook up a DirecTV, Primestar or other DBS receiver as the LNBF on this dish will not pick up signals in the DBS broadcast band which is 12.2-12.7 GHz as opposed to regular Ku-band 11.7 to 12.2 GHz.

❖ Bottom Line

Setting up this dish was a snap. It's fun to deal with such a small antenna with so few parts. Its low profile makes it a natural for town houses, or mobile home parks alike.

I found tuning in with an analog receiver amazingly simple. Loosening the AZ/EL mount and rotating the dish in the direction of the Clarke Belt, it's possible to see when you're anywhere near a satellite by what's happening on the TV screen. Watch the screen for sync bars and listen for audio.

This is not so easy with a digital receiver. There's very little leeway when trying to lock-in a digital signal. The best thing to do is watch the "locked" LED on the receiver. I've found most MPEGII receivers are very sensitive and if you can get the LED to even flicker you know you're almost there.

Of course, once you've locked on to a digital signal the picture is perfect. But, I was very surprised to see the sharp analog pictures this dish was also capable of receiving. I even happened onto SBS4, an old Ku-band satellite long past its expected life span, wobbling away in an inclined orbit and giving startlingly good pictures.

If you're living in a tight space and thought you'd never be able to have fun in the Clarke Belt you're in for a treat with this little dish. If you're interested in watching programming not found in most cable or DBS line-ups, you'll find this little dish a great place to start. For more information visit **www.smallear.com** or call 877-463-3212 (orders only) or FAX: 888-731-1834.

VIEW FROM ABOVE

WATCHING THE WEATHER SATELLITES

Lawrence Harris
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http://www.itchycoo-park.freeserve.co.uk/wxsats.html

WXSats Turn 40

The fortieth anniversary of the launch and operation of the first weather satellite was celebrated on April 1st, and I had my own small celebration (more on this later). The Commerce Department's National Oceanic and Atmospheric Administration noted the anniversary by launching a web site devoted to the event – see below. With today's advanced technology, and with satellite images of clouds on every television weather forecast, it may be difficult to remember when there were no weather satellites!

The world's first was a polar-orbiting satellite (named TIROS for Television Infrared Observation Satellite), launched from Cape Canaveral on April 1, 1960. It quickly demonstrated the ability to monitor earth's cloud cover from satellite altitudes. At that time there was no such thing as a domestic computer, and definitely no one was monitoring the telemetry as a hobby. How times have changed!

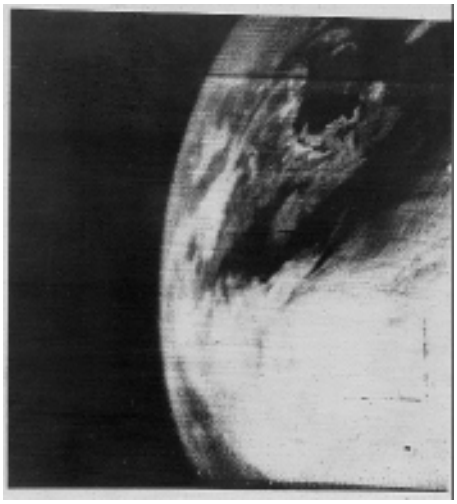

Fig. 1. Tiros - the first picture

My own station, a previously little-used basement room full of junk, acquired its first weather satellite receiver in the mid-1980s when I obtained a "kit." Although the kit worked, it required a casing, and by the time I had bought a metal cover, knobs, wiring and switches, there seemed little financial saving for the many hours spent locating the parts. Not too many months later I upgraded the "station" by buying a proper receiver. In this way, APT (automatic picture transmission) entered the household. The results were very pleasing, perhaps due in no small part to the fact that it was mainly WXSATs that used the 137 MHz band – interference from non-APT satellites was minimal. Decoding was performed by a framestore.

My next upgrade was the purchase of a downconverter from the only UK firm that I could identify as manufacturing and selling them – Microwave Modules. If you are already receiving APT, this could be the cheapest way into WeFAX reception – as discussed in last month's review of an active feed and downconverter that has recently arrived on the market from Timestep and is supplied by Swagur Enterprises. In Britain, the geostationary WeFAX satellite is Meteosat-7. Continental America is served by both GOES-8 on the east and GOES-10 on the west.

My third upgrade was a significant one: I bought a PDUS system to receive Primary Data from Meteosat. GOES provides a similar facility. The constant stream of high resolution images was enough to satisfy any hobbyist. Sadly, this is no longer the situation for Europeans because Eumetsat encrypts almost all home-produced images, and demodulator units are extremely costly for amateurs.

❖ One more step up

House repairs, summer holidays, birthday presents for the family – all these take precedence in the family budget. Well, usually! After consulting my financial adviser (wife Marion), the buying of a high resolution picture telemetry (HRPT) system was approved! I must say that this was the last item that I ever expected to buy. You may read a short note about it in next month's column, as I now await delivery.

❖ Operational WXSATs

One that should *not* be operating – NOAA-9 – apparently returned to haunt us again around April 9. My utility scanner (non-WXSAT) sprang to life, locking for a few seconds on 136.77 MHz, and – just as I feared – then locked for a few seconds on 137.50 MHz. I checked the satellite predictions program for each NOAA WXSAT: sure enough – there was NOAA-9 near maximum elevation. Because NOAA-11 was also above the horizon, I monitored two or three passes and quickly eliminated other satellites.

Transmitting telemetry in a more official capacity, satellites NOAA-14, NOAA-15, Resurs 01-N4 and Meteor 3-5 have continued fairly nominal operations. Here in southwest Britain we have had a few sunny, clear days so I did some contrast stretching of the Resurs images. Because its sensors respond mostly to cloud and snow, rather than land, a typical image tends to lack land detail. If you use an image processing

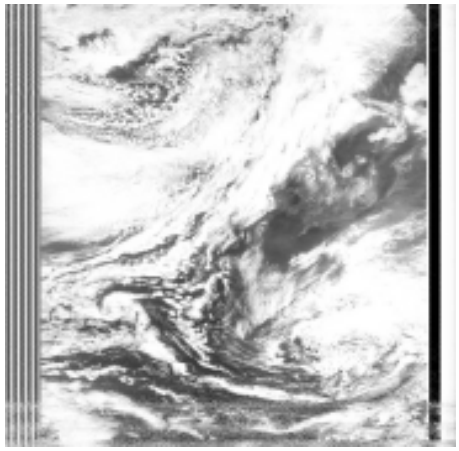

Fig 2: Resurs 01-N4 1154UTC April 10, 2000

Fig 3: Meteor 3-5 1607UTC April 2, 2000 north Africa to Greenland

program to enhance the brightness of pixels in the near-black region, land jumps out at you. Because of the higher resolution of Meteor and Resurs images, careful enhancement can give a pleasing result.

Peter Venlet sent a picture (see figure 4) from NOAA-14, showing his home state of Michigan and some of the great lakes. I believe Peter has recently become interested in the reception and demodulation of WXSAT signals, and kindly sent this picture received on April 8, 2000, during the afternoon.

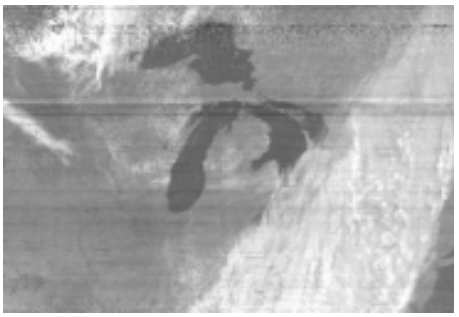

Fig 4: NOAA-14 APT image of Michigan and the Great Lakes from Peter Venlet, N8YEL

❖ Fengyun-2A ceases operations

Mike Kenny of Satellite Engineering, Bureau of Meteorology, Melbourne, Australia, keeps us all up-to-date with Fengyun operations, and advised us that the geostationary Fengyun ceased operations on March 3 because of a despin system problem. This WXSAT will be moved from its location at 105°E to a new one at 86.5°E. China plans to launch the next FY-2 series satellite in May.

The nomenclature of Chinese satellite names initially confused me, but Mike kindly explained how the system works. Basically, Chinese satellites are only named after a successful launch. Consequently, the satellite that exploded on 2 April, 1994, causing fatalities, did not receive a name – although one could reasonably call it Fengyun-2A. The first successful launch was classified by the Chinese as FY-2A, although we would list it as FY-2B.

The Chinese FY-2B will be the same type as FY-2A (that is, having a 3-channel VISSR instrument) and is to be launched into the 105° E position. FY-2C, D and E are expected to follow on at two to three year intervals, and each will carry a 5-channel VISSR. The S-FAX experiment is to be stopped.

❖ GOES-L (potentially GOES-11) operations

Steve Arnett of the Satellite Analysis Branch advised the Internet weather satellite forum that the launch of GOES-L was still on schedule for May 3, 2000, though there has been a change in the planned location. The satellite is being launched to a position above 104 W instead of 90 W. The satellite will be named GOES-11 after checkout, and there is an extensive science test period prior to the satellite being placed into on-orbit storage. The main mission is carried out by the primary instruments – the Imager and the Sounder. The imager is the multi-channel radiometer that senses direct radiant energy together with reflected solar energy from the Earth's surface and atmosphere. The Sounder provides data to determine the vertical temperature and moisture profile of the atmosphere, surface and cloud top temperatures, and ozone distribution.

Many other instruments are carried on board: a search and rescue transponder, a data collection and relay system for ground-based data platforms, and a space environment monitor. The latter consists of a magnetometer, an X-ray sensor, a high energy proton and alpha detector, and an energetic particles sensor. All are used for monitoring the near-Earth space environment or solar "weather."

❖ GOES Wefax transmissions

The launch of GOES-L (to be renamed GOES-11 when in orbit) is a timely event that will provide an on-orbit spare for future use. A few editions ago, I started an occasional series covering the Wefax transmissions available from GOES-8, positioned above longitude 75 west, over the east coast of America. Those previous notes covered transmissions from 0000 UTC until the first actual GOES-8 image transmitted at 0046 UTC – originating from 2345 UTC the previous day. Apart from three transmissions of meteorological information from the W series (W500 through W502), the remaining GOES infrared quadrant images are transmitted in sequence.

At 0126 UTC, the larger scale continental US image of 4 km resolution is transmitted, followed by the full-disk (FD) infrared image of 16 km resolution. A study of the entire sequence shows that all images form part of various sequences transmitted during each 24-hour period. The GOES-8 FD infrared image is also transmitted at 0406, 0722, 1322, 1602, 1902, and 2254 UTC. Complementing this sequence is the GOES-8 full-disk water vapor, and of course the GOES-10 images as well.

Water vapor quadrants from GOES-8 follow the infrared transmissions in five slots until 0154 UTC. Following more images from GOES-10, the first sequence of NOAA-14 images is transmitted. During its orbit, NOAA-14 is recording data from the imaging scanner. Data is recovered during passes over the ground station, and formatted for transmission from GOES. Visible-light and infrared images recorded over both poles are transmitted. At 0210 UTC, a sequence of five images is transmitted; the first is from the northern hemisphere region from 10 east to 80 west, in visible-light – labeled W026. Subsequent images complete the W026 through W030 group, covering both poles and a Mercator projection.

A second sequence of NOAA-14 polar images is transmitted between 0514 and 0554 UTC, followed by later sequences as well as "odd" images transmitted singly. This all adds up to a comprehensive collection of imagery covering almost the whole planet.

For more details about NOAA's web provision of these images visit:
http://psbsgi1.nesdis.noaa.gov:8080/PSB/IMAGES/wefax.html

Frequencies

NOAA-14 transmits APT on 137.62 MHz
NOAA-15 transmits APT on 137.50 MHz
NOAAs transmit beacon data on 137.77 or 136.77 MHz
Meteor 3-5 transmits APT on 137.30 MHz when in sunlight
Resurs 1-4 transmits APT on 137.85 MHz
Okean-4 and Sich-1 sometimes transmit APT briefly on 137.40 MHz
GOES-8 and GOES-10 use 1691 MHz for Wefax

NOTICE: It is unlawful to buy cellular-capable scanners in the United States made after 1993, or modified for cellular coverage, unless you are an authorized government agency, cellular service provider, or engineering/service company engaged in cellular technology.

Larry Van Horn, N5FPW
email: larry@grove-ent.com

SHARES on ALE

While we have talked about SHARES (Shared Resources) in this column before, in this month's column we take a look at this government system from the perspective of ALE (Automatic Link Establishment) (see the feature this month on ALE by yours truly).

While there are a couple of hundred frequencies that are assigned to the SHARES frequency pool (contributed by each of the agencies that are part of the system), we find that the majority of the SHARES activity occurs on the SHARES Coordination Network (SCN). SCN channels 3 through 8 are reserved for ALE activity.

SHARES Coordination Network (SCN)

Channel 1	5236.0	Voice
Channel 2	14396.5	Voice
Channel 3	4490.0	ALE
Channel 4	5711.0	ALE
Channel 5	9106.0	ALE
Channel 6	11217.0	ALE
Channel 7	15094.0	ALE
Channel 8	17487.0	ALE/SHARES Telephone Interface
Channel 9	6800.0	BBS (digital operations AMTOR/ PACTOR/G-TOR/CLOVER)
Channel 10	13242.0	BBS (digital operations AMTOR/ PACTOR/G-TOR/CLOVER)

By monitoring the SHARES HF ALE network a variety of government stations will be heard. Table 1 is an abbreviated list of some of these stations heard recently on the SCN.

❖ FBI Aircraft

Ron up in the Middle Atlantic area passes along the following info regarding FBI aircraft he has monitored in his area of the country.

"The FBI is operating several light aircraft, at least one of which has been identified as a Cessna 172, out of Harry P. Davis/Manassas Regional Airport in Manassas, Virginia. The aircraft use the callsign Ross ## and usually perform low-level surveillance flights in/around the Washington DC area. I have logged Ross 88 flying up the coast to the New York area, probably ferrying some FBI personnel to/from FBI headquarters in New York City. So far I've logged Ross 11, 12, 15, 33, 41, 83, 84 and 88."

Thanks, Ron, for the heads up on these fascinating aircraft.

❖ FEMA Freqs

Someone dropped me a note recently and asked if I would run all of the known FEMA HF frequencies. For our readers and that anonymous correspondent, here are FEMA's shortwave frequencies (kHz).

2320 Fox 1	13935 Fox 37
2360 Fox 2	13956
2377 Fox 3	14450 Fox 41
2445 Fox 4	14567 Fox 39
2658 Fox 5	14776 Fox 42
3341 Fox 6	14836 Fox 43
3379 Fox 7	14871 Fox 47
3388 Fox 8	14885 Fox 44
4603 Fox 9	14899 Fox 45
4780 Fox 10	14908 Fox 46
5211 Fox 11	15509 Fox 48
5378 Fox 12	15708 Fox 50
5402 Fox 13	15840 Fox 49
5821 Fox 14	16201 Fox 51
5961 Fox 15	16238 Fox 52
6049 Fox 16	17519 Fox 53
6106 Fox 17	18483 Fox 54
6108 Fox 18	18744 Fox 55
6151 Fox 19	19969 Fox 57
6176 Fox 20	20027 Fox 58
6809 Fox 21	20063 Fox 59
7348 Fox 22	20361 Fox 56
7428 Fox 23	20414 Pacific
9462 Fox 24	21866 Fox 60
10194 Fox 25	21919 Fox 61
10493 Fox 26	22983 Fox 62
10588 Fox 27	23028 Fox 63
10899 Fox 31	23390 Fox 64
11108 Fox 32	23451 Fox 65
11545 Fox 35	23550 Fox 66
11721 Fox 28	23814 Fox 67
11801 Fox 29	24008 Fox 68
11957 Fox 30	24060 Pacific
12112 Replaces 12271.5	24105 Pacific
12129 Fox 33	24135 Pacific
12219 Fox 35	24160 Pacific
13446 Fox 36	24191 Pacific
13451 Pacific	24282 Fox 69
13783 Fox 40	24526 Fox 70
13894 Fox 38	24819 Fox 71

Other FEMA frequencies of note (MHz):

27650 27900 134.1 138.225 138.450 138.575 138.875 139.450 139.775 139.825 139.925 139.950 140.025 140.900 140.925 141.100 141.300 141.725 141.850 141.875 141.950 142.350 142.375 142.400 142.425 142.925 142.950 142.975 143.000 143.050 143.075 143.250 143.475 143.500 143.525 143.600 143.625 143.850 164.500 164.8625 165.4375 165.6625 168.250 169.445 169.505 169.875 170.245 170.305 171.045 171.105 171.845 171.905 173.025 173.6125 173.7875 406.825 408.400 408.725 408.775 409.125 411.150 411.375 411.975 412.350 417.600 417.700 418.050 418.075 418.575

Table 2 concludes our exploration of the VHF high government frequency band (begun in the December 1998 issue of the *Fed Files)*, by profiling the last 1 MHz in this range: 173.0-173.9875 MHz.

Next month we will turn our attention to a portion of the spectrum which has a lot of skip action on it these days due to higher sunspot counts – the federal subbands in the 30-50 MHz spectrum range. Until next month, 73 and good hunting.

Table 1: Selected SHARES SCN Stations

046NHQCAP	USAF CAP	Unknown	
047NHQCAP	USAF CAP	Unknown	
90KNY	NCS	Arlington, VA	KNY 90
908WGY	FEMA	Denver, CO	WGY 908
991NHQCAP	USAF CAP	Unknown	
270049	USAF	Aircraft C-17A	
A1A	Unknown	Unknown	
AAR1ISMARS	USA MARS	Waterbury, CT	AAR1IS
AAT3BFMARS	USA MARS	Newark, DE	AAT3BF
AAT3BFMQP	Unknown	Newark, DE	
BRG	Unknown	Unknown	
CAP	USAF CAP	Unknown	
CAP902	USAF CAP	Unknown	
CON	NGB	Concord, NH	NGB40
DO2	DISA	Arlington, VA	
D10	DISA	Arlington, VA	
DLA303	DLA	Bremerton, WA	DLA 303
DOEORO	DOE	Oak Ridge, TN	
DOEORO3	DOE	Oak Ridge, TN	
GR1	Unknown	Unknown	
GR2	Unknown	Unknown	
GRK	Unknown	Unknown	
HHS	HHS	Rockville, MD	WWD-58
HHS000	HHS	Unknown	
HHS001	HHS	Unknown	
HO1	FBI	Houston, TX	KKI 88
HOP	Unknown	Unknown	
KGD34NCC	NCC	Arlington, VA	KGD 34
KIH98	FBI	Mobile, AL	
KNR33	NCC	Falls Church, VA	
KPA725GSA	GSA	Chicago, ILKPA-725	
NTAWNFT417C	NTA	Broad Run, VA 417C	W N F T
POB	Unknown	Unknown	
QT2	FBI	Quantico, VA	KGE 22
RIC	USAF CAP	Richmond, VA	
	CAP Region 2 MER/CAP National Tech Center		
RME	Unknown	Unknown	
RMEALT	Unknown	Unknown	
USANG2410	USANG	Wilmington, DE	AAB1DE
WAR46	DoD	Raven Rock, PA	1111th Signal

173.0000	Energy Department (Nationwide), FAA, Federal Law Enforcement Training Center, Post Office
173.0125	(No reported activity)

Table Two: Federal Frequency Allocations: 173-173.9875 MHz

173.0250	Air Force, Army, Energy Department, Environmental Protection Agency, FBI, Federal Law Enforcement Training Center, FEMA, Forest Service, IRS, Labor Department, NASA, National Environmental Satellite, Data and Information Service, National Weather Service, Nuclear Regulatory Commission, Veterans Administration
173.0375	(No reported activity)
173.0500	Air Force, Animal/Plant Health Inspection Service, Army, Bureau of Prisons, Energy Department, FAA, FBI, Forest Service, NASA, National Environmental Satellite, Data and Information Service, Railroad Transportation Test Center, TVA
173.0625	(No reported activity)
173.0750	Air Force, Army, FAA, FBI (Nationwide), Federal Law Enforcement Training Center, LOJAC-stolen vehicle recovery devices (Nationwide), National Environmental Satellite, Data and Information Service
173.0875	Army
173.1000	Air Force, Animal/Plant Health Inspection Service, Army, Energy Department, FAA, FBI (Nationwide), NASA, National Weather Service, Veterans Administration
173.1125	(No reported activity)
173.1250	Air Force, Army, Bureau of Prisons, FBI, Federal Law Enforcement Training Center, Navy, Veterans Administration
173.1375	(No reported activity)
173.1500	Air Force, Army, Energy Department, FBI (Nationwide), Railroad Transportation Test Center
173.1625	(No reported activity)
173.1750	Air Force, Army, Energy Department, Environmental Research Lab, FAA, FBI, Federal Law Enforcement Training Center, International Boundary and Water Commission, NASA, Veterans Administration
173.1875	(No reported activity)
173.1906	Low power, non-voice 5 kHz bandwidth splinter frequency (until January 1, 2005)
173.1937	Low power, non-voice 5-10 kHz bandwidth splinter frequency (until January 1, 2005)
173.1968	Low power, non-voice 5 kHz bandwidth splinter frequency (until January 1, 2005)
173.2000	(No reported activity)
173.2125	(No reported activity)
173.2250	Civilian Assignment: Video Production/Press Relay (Newspapers)
173.2375	(No reported activity)
173.2500	Civilian Assignment: Power and Water Utilities
173.2625	Army
173.2750	Civilian Assignment: Video Production/Press Relay (Newspapers)
173.2875	(No reported activity)
173.3000	Energy Department and Civilian Assignment: Power and Water Utilities
173.3125	(No reported activity)
173.3250	Civilian Assignment: Video Production/Press Relay (Newspapers)
173.3375	Forest Service (NC)
173.3500	Civilian Assignment: Power and Water Utilities
173.3625	(No reported activity)
173.3750	Civilian Assignment: Video Production/Press Relay (Newspapers)
173.3875	(No reported activity)
173.4000	Experimental Testing
173.4125	Air Force (Nationwide), Army (Nationwide), Corps of Engineers, National Environmental Satellite, Data and Information Service
173.4205	Air Force
173.4250	Air Force, Coast Guard, NASA (Nationwide)
173.4285	Air Force
173.4375	Air Force, Army, Corps of Engineers, FAA, Navy
173.4500	Coast Guard
173.4625	Air Force (Nationwide), Army (Nationwide), Corps of Engineers
173.4750	(No reported activity)
173.4875	Air Force (Nationwide), Army (Nationwide), Corps of Engineers
173.5000	Army, Customs, NASA, Navy, NOAA Aircraft Operations Center
173.5125	Air Force (Nationwide), Army (Nationwide), Energy Department, Navy
173.5250	(No reported activity)
173.5375	Air Force (Nationwide), Army (Nationwide)
173.5500	NASA
173.5625	Air Force (Nationwide), Army (Nationwide), Energy Department, FAA, Veterans Administration
173.5750	Air Force
173.5875	Air Force (Nationwide), Army (Nationwide), Coast Guard, Navy
173.6000	Army
173.6125	Agriculture Department, Air Force, Army, Bureau of Prisons, Energy Department, FEMA, Labor Department, NASA, Post Office, Veterans Administration
173.6250	(No reported activity)
173.6375	Air Force, Army, Energy Department, Geologic Survey, NASA, Post Office, Railroad Transportation Test Center, Veterans Administration
173.6500	Air Force
173.6625	Air Force, Army, Energy Department, NASA, Veterans Administration
173.6750	Interior Department (Nationwide)
173.6875	Air Force, Army, Energy Department, NASA, Post Office
173.7000	Army
173.7125	Air Force, Army, Energy Department, FBI, Veterans Administration
173.7250	(No reported activity)
173.7375	Air Force, Army, Coast Guard, Energy Department, FBI, Federal Law Enforcement Training Center, Fish and Wildlife Service, NASA, Post Office, State Department (Nationwide), Veterans Administration
173.7500	(No reported activity)
173.7625	Agriculture Department (Nationwide), Animal/Plant Health Inspection Service, Bureau of Indian Affairs, Bureau of Land Management, Food Safety and Inspection Service, Forest Service, Geologic Survey, Interior Department (Nationwide), Mine Safety and Health Administration (Nationwide), National Park Service, TVA
173.7750	Agriculture Department (Nationwide)
173.7875	Air Force, Army, Bureau of Prisons, Energy Department, Federal Law Enforcement Training Center, FEMA (Nationwide), Forest Service, NASA, National Park Service, Post Office
173.8000	Army
173.8125	Air Force, Army, Bureau of Land Management (Nationwide), Energy Department, FBI, NASA, Veterans Administration
173.8250	Interior Department (Nationwide)
173.8375	Air Force, Army, Bureau of Prisons, Coast Guard, Energy Department, FBI, Post Office, Veteran Administration
173.8500	Air Force
173.8625	Air Force, Army, Bureau of Land Management, Bureau of Prisons, FBI, IRS (Nationwide), NASA, Small Business Administration (Nationwide)
173.8750	(No reported activity)
173.8875	Air Force, Army, ATF (Nationwide), Energy Department, FBI, Small Business Administration (Nationwide)
173.9000	FAA, NASA (Nationwide)
173.9125	Air Force, Army, EPA (Nationwide), FBI, Forest Service, Railroad Transportation Test Center, Veterans Administration
173.9250	(No reported activity)
173.9375	Air Force, Army, Energy Department, FBI, Post Office
173.9500	(No reported activity)
173.9625	Army, Bureau of Prisons, Energy Department, FBI, Forest Service, Geologic Survey, International Boundary and Water Commission, Post Office, US Information Agency
173.9750	National Weather Service (Hydrologic)
173.9875	Air Force, Army, Energy Department, FAA, FBI, Forest Service, Geologic Survey

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The Case for APCO Project 25

In January 1982, during a snowstorm, Air Florida flight 90 crashed into the 14th Street bridge in Washington, D.C. Half an hour later a Metrorail accident occurred just a few miles away. Responding rescue personnel from federal, state, and local public safety agencies quickly discovered that coordinating their efforts was extremely difficult because radios from each agency used different frequencies and signaling techniques. On-scene commanders were forced to borrow radios from one another to coordinate their crew activities.

More recently, the Oklahoma City bombing further emphasized the need for interoperability. More than a dozen search and rescue teams arrived, each with at least fifty personnel and their own communications system. The systems, for the most part, could not communicate with each other. Two-way radio was the only way to relay information back to dispatchers and request specific support, since wireline and cellular phone lines were damaged or overloaded. At one point it became so bad that one agency had to resort to sending runners with messages.

Major natural disasters such as hurricanes, earthquakes, and floods are typically handled by several different public safety agencies where the ability to communicate between agencies is also a necessity.

❖ Project 25

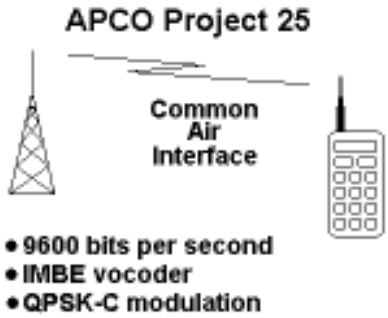
To address the problem of interoperability as well as make better use of scarce radio frequencies, in 1989 the Association of Public Safety Communications Officials International (APCO) established Project 25 (P25). Representatives from Federal, state, and local governments began an effort to develop a set of common technical standards for land mobile radio systems. An additional benefit of a common standard would allow any number of manufacturers to produce compatible equipment, thus increasing competition and lowering prices. P25 promised to avoid locking customers into a proprietary system from a single manufacturer.

Equipment manufacturers control most standards processes. In contrast, P25 documents were developed by the Telecommunications Industry Association (TIA) based on user community needs, then approved by the APCO Project 25 Steering Committee. Phase I of P25 is nearly complete, with 30 of 32 standards documents now available, totaling more than 1800 pages.

P25 is not a single standard but really a number of individual protocols that can be mixed and matched. A "Project 25 compliant" system may really use only a few of the many standards. For instance, a P25 system may be conventional or trunked, use encryption or transmit in the clear, and carry voice, data, or both.

❖ Common Air Interface

P25 systems use what is called the Common Air Interface (CAI). This standard specifies the type and content of signals transmitted by compliant radios. One radio using CAI should be able to communicate with any other CAI radio, regardless of manufacturer.



At present, most public safety channels are 25 kHz wide. Current P25 radios are designed to use 12.5 kHz wide channels, allowing two conversations to take place where only one used to fit. Eventually, P25 radios will use 6.25 kHz channels, allowing four times as many conversations compared to analog.

P25 radios must also be able to operate the old way – in analog mode on 25 kHz channels. This is called *backward compatibility* and allows agencies to gradually transition to digital while continuing to use older equipment.

P25 transmissions may be protected by encryption. The standards specify the use of the U.S. Data Encryption Standard (DES) algorithm, but other algorithms may be used. There is an additional specification for over-the-air rekeying (OTAR) to deliver new encryption keys to radios.

P25 channels that carry voice or data, called *traffic channels*, operate at 9600 bits per second (bps). These channels are protected by a substantial amount of forward error correction, which helps receivers to compensate for poor radio frequency conditions and improves usable range.

P25 also supports data transmission, either piggybacked with voice (so-called *slow data*), or in several other modes up to the full traffic channel rate of 9600 bps.

❖ Digitized Voice

The most important difference to scanner listeners is the fact that voice transmissions are now digital rather than analog. P25 uses a specific method of digitized voice called Improved Multi-Band Excitation (IMBE). The IMBE voice encoder-decoder (*vocoder*) listens to a sample of the audio input and only transmits certain characteristics that represent the sound. The receiver uses these basic characteristics to produce a synthetic equivalent of the input sound. IMBE is heavily optimized for human speech and doesn't do very well in reproducing other types of sounds, including dual-tone multifrequency (DTMF) tones.

The IMBE vocoder samples the microphone input every 20 milliseconds and produces 88 bits of encoded speech, or said another way, the vocoder produces speech characteristics at a rate of 4400 bits per second. Error correction adds another 2800 bps, and signaling overhead brings the total rate to 9600 bps. P25 standards specify exactly how that information is structured and transmitted.

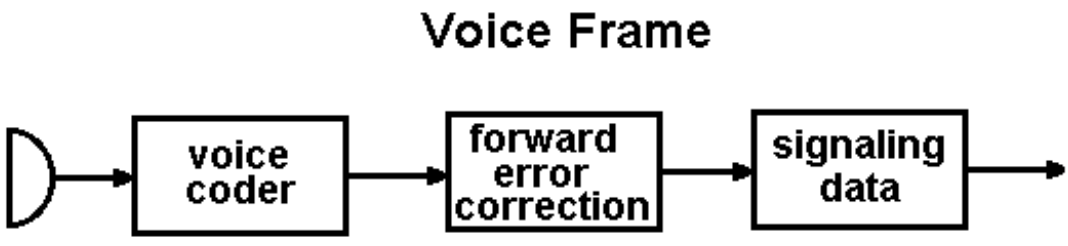
❖ Project 25 Manufacturers

Only a handful of manufacturers have demonstrated P25 mobile and portable radios, and all of them have been non-trunked. These companies include Motorola, Transcrypt International/EF Johnson, Racal, RELM and IDA. However, it appears most agencies have chosen to purchase Motorola radios, specifically the Spectra mobiles, ASTRO portables and the XTS-3000 portable.

❖ Project 25 versus Motorola Astro

There is some confusion regarding the similarities and differences between Project 25 and Motorola's ASTRO product line.

ASTRO equipment is capable of operating using the P25 CAI, transmitting and receiving IMBE digital voice at 9600 bps. Depending on configuration, ASTRO equipment may also use a



different method of digital speech called Vector-Sum-Excited Linear Prediction (VSELP), which is also used in some digital cellular systems but is not compatible with Project 25.

ASTRO systems may also use an "analog" control channel (usually Motorola Type II format) operating at 3600 bps rather than the P25 trunking standard at 9600 bps. This is commonly done to support older analog radios that can only understand the 3600 bps control channel.

Many public safety agencies are moving to P25 systems, switching their voice traffic from analog to digital IMBE.

Michigan

The State of Michigan claims their Public Safety Communications System is the first APCO Project 25 compliant statewide radio system. The Motorola 800 MHz ASTRO SmartZone digital trunked communications system complies with P25 standards for common air interface, trunked operation, and encryption. All seven State Police districts are part of the system, as well as a number of other public safety agencies, including park rangers, highway workers, county and municipal police and fire departments, and 9-1-1 dispatch centers. The complete system is scheduled to be in operation by the spring of 2002 serving a total of more than 14,000 mobile and portable radios.

Florida

The Florida Highway Patrol shares a large 800 MHz P25 system in central and southern Florida with a number of other state agencies including the Florida Department of Law Enforcement, Alcohol and Tobacco, Fish and Wildlife Conservation, and Motor Carrier Compliance. The system has recently experienced some problems, described as a "glitch" that occasionally disables the system for its 3,000 users. Technicians are working with Motorola to identify and correct the problems in the $350 million system, but have not conclusively fixed the glitch.

Frequencies include 853.9625, 854.0125, 854.0375, 854.0875, 854.1125, 854.1375, 854.1875, 854.2375, 854.2625, 854.2875, 866.4500, 866.9375, 866.9625, 866.9750, 866.9875, 867.4375, 867.450, 867.4750, 867.9375, 867.9500, 867.9625, 867.9750, 867.9875, 868.4500, 868.4625, 868.4750, 868.4875, 868.9375, 868.9500, 868.9625, 868.9750, and 868.9875 MHz.

Connecticut

Last December the State of Connecticut announced the activation of their $47 million wireless voice and data system. Motorola sold them an 800 MHz ASTRO SmartZone trunked voice system, including equipment for a dozen dispatch centers and more than 2,000 P25-compliant digital radios.

In addition, an RD-LAP wireless data communications system connects patrol car laptops and global positioning system (GPS) receivers to the nearest dispatch center, providing in-car access to state and federal criminal information databases. The data system operates on a different set of frequencies than the voice network.

41 towers provide coverage for nearly all areas of the 5,000 square mile state. The system is expected to be in full operation by mid-2000.

Mesa, Arizona

The city of Mesa, Arizona, recently approved a $15 million contract with Motorola for a new 800 MHz digital trunked radio system for police, fire, and other city workers. Nearby municipalities of Gilbert and Apache Junction will share the system.

Fairfax County, Virginia

Fairfax County, Virginia, is in the process of replacing their 20 year old analog system with a twenty channel, 800 MHz P25 trunked radio system that will use IMBE voice. Although scanner listeners won't be able to hear the 800 MHz transmissions, county Fire and Rescue have promised to simultaneously broadcast dispatch information on 460.575 MHz.

Eight repeater sites will be located in Butts Corners, Fair Oaks, Great Falls, Lorton, Merrifield, Mount Vernon, Reston, and Springfield.

Baltimore, Maryland

Last fall the City of Baltimore switched to a digital system using an IMBE vocoder for all voice communications. Control channels are reportedly still operating at 3600 bps.

Active frequencies include 866.2250 866.3500, 866.6625, 866.6250, 866.8250, 866.8500, 866.8750, 866.9000, 867.1500, 867.1750, 867.2125, 867.4000, 867.4375, 867.4625, 867.8250, 867.9000, 867.9250, 867.9875, 868.1000, 868.1250, 868.1500, 868.3000, 868.4500, and 868.7000 MHz.

❖ Project 25 scanners

Although the APCO Project 25 standards are expensive for non-governmental agencies (more than $2000 for the full set), they are open and available. It is certainly possible to produce a scanner or an add-on box to an existing scanner, that could decode the IMBE voice portion of P25 traffic channels. Stay tuned to the column for further developments along this line.

One possible stumbling block to a hobby P25 scanner is the fact that the IMBE vocoder is covered by patents assigned to Digital Voice Systems, Inc. DVSI has licensed IMBE for use in P25; it is not clear whether they would do so for a scanner application.

Both Motorola and IFR manufacture communications analyzers that will decode P25, but they are priced well above the price range of an average scanner listener.

That's all the space I have for this month. I welcome comments, questions, frequency lists, talkgroups, and general updates via electronic mail to *dan@decodesystems.com*. My web page at **www.decodesystems.com** also has a variety of radio-related subjects.

Larry Van Horn, N5FPW
email: larry@grove-ent.com

Fast Food Frequency Pairs for the United States

Courtesy of Bob Eisen

The master of the fast food kiosk is back. Bob Eisen provides the latest info on this interesting and universally available aspect of the scanner hobby. You will also find new and detailed listings for various companies only on the Grove Enterprises website. Click on the *Monitoring Times* link and go to the *MT* reference library.

The most common frequency pairs to check for fast food restaurant are:

Speaker	Headset
30.8400	154.5700
33.1600	154.5150
33.4000	154.5400
35.0200	154.6000
154.5700	170.2450
154.6000	171.1050
457.5125	468.4875
457.5375	468.3875
457.5500	467.7750
457.6000	467.8250
469.0125	464.0125

Headset/Speaker frequency pairing for VHF-low / VHF-high band:

Note: The frequency pairs marked with an "" are either odd or missing.*

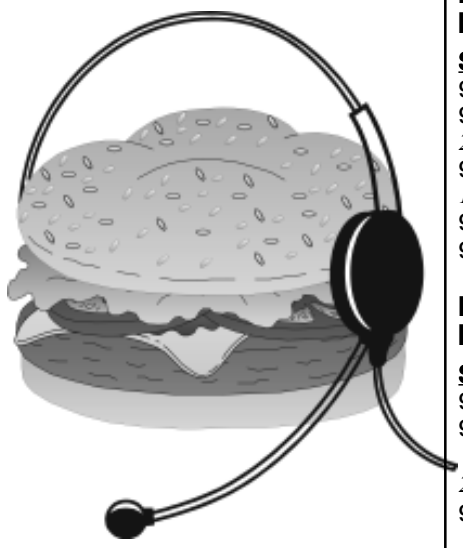
Speaker	Headset
30.840	154.570
31.000	170.305
31.240	151.745
31.325	151.865*
31.400	154.515*
33.140	151.895
33.140	170.305*
33.160	154.515
33.400	154.540
33.400	154.570*
35.020	154.490*
35.020	151.895*
35.020	154.600
35.120	151.775
35.880	151.835
35.960	151.805

Headset/Speaker frequency pairing for VHF-high band:

Speaker	Headset
151.715	169.445
151.775	171.905
154.570	170.245
154.600	171.105
154.600	170.245*

Headset/Speaker frequency pairing for UHF band:

Speaker	Headset
457.5125	467.7375
457.5250	467.7500
457.5375	467.7625
457.5500	467.7750
457.5625	467.7875
457.5750	467.8000



457.5875	467.8125
457.6000	467.8250
457.6125	467.8375
457.5125	468.4875
457.5250	467.8250*
457.5375	468.3875
457.6000	467.7500*
462.7625	467.8875
460.8875	465.8875
461.0375	466.0375
461.0875	466.0875
461.1125	466.1125
461.2875	466.2875
461.5375	462.1625*
461.5375	466.5375
462.1625	467.1625
464.9625	469.9625
464.9875	469.9875
469.0125	464.0125
469.0375	464.0375
469.0625	464.0625
469.0875	464.0875
469.1125	464.1125
469.1375	464.1375
469.1625	464.1625
469.1875	464.1875
469.2125	464.2125
469.2375	464.2375
469.2625	464.2625
469.2875	464.2875
469.3125	464.3125
469.3375	464.3375
469.3625	464.3625
469.3875	464.3875

Headset/Speaker frequency pairing for ISM band Wide FM (3M Headsets):

Speaker	Headset
920.0125	903.0125
920.0250	903.0250
25 kHz spacing up through	
921.0000	904.0000
12.5 kHz spacing up through	
921.9750	904.9750
921.9875	904.9875

Headset/Speaker frequency pairing for ISM band (HM Electronics):

Speaker	Headset
902.0125	926.0125
902.0250	926.0250
25 kHz spacing up through	
903.0000	927.0000
12.5 kHz spacing up through	
903.9750	927.9750
903.9875	927.9875

CTCSS PL Tones used by various headsets for internal and external communications

Outside	Inside
77.0	162.2
88.5	123.0 Most Common PL Tones used by HM Electronics
100.0	131.8
107.2	141.3
114.8	107.2
114.8	127.3
118.8	110.9 Most Common PL Tones used by Panasonic
156.7	Not applicable
162.2	Not applicable
162.2	173.8

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Chicago, and the Funnies

Welcome aboard and fasten your seatbelts! Today we will look at frequencies from the Chicago ARTCC and some military freqs as well. Thanks to Fred Shabec, the Web Master of CARMA – the Chicago Area Radio Monitoring Association – for contributing his assistance and permission to use these. He extends a warm welcome to all visitors to CARMA's website at **http://www.theramp.net/shabec/carma.htm**

Incidentally, pilot communications on these frequencies can be heard from a long distance, because they are located at remote transmitters, some of which are quite far away from the Chicago ARTCC (ZAU).

Location	VHF	UHF	Altitude
Aurora	123.750	354.000	Low
Bradford	124.550	398.900	Low
Bradford	127.950	353.600	Low
Burlington	135.600	370.950	Low
Cedar Rapids	132.800	261.500	Low
Cedar Rapids	135.975	335.550	Super High
Chicago Hgts	132.950	272.700	Low
Crown Point	127.800	387.050	Low
Danville	135.750	353.950	Low
Dells	133.300	380.350	Low
Des Moines	127.050	319.800	Low
Des Plaines	120.350	317.400	Low
Des Plaines	133.200	360.800	Low
Des Plaines	128.650	298.900	Low
Downers Grove	127.600	363.200	Low
Dubuque	133.950	281.400	Low
Dubuque	127.775	343.600	High
Dubuque	125.225	285.500	Super High
Fort Wayne	119.850	362.300	Low
Fort Wayne	126.35	269.100	High
Goshen	127.550	263.100	Low
Goshen	135.900	317.600	Low
Goshen	133.900		Low
Grand Rapids	134.950	287.900	Low
Grand Rapids	126.125	319.100	High
Hampshire	133.350	381.400	Low
Hampshire	134.200	348.700	Low
Horicon	121.375	263.000	?
Horicon	132.225	327.800	Super High
Horicon	135.550	343.900	All
Joliet	133.150	301.500	Low
Jones	124.825	343.700	High
Jones/Monee	133.425	360.750	Super High
Jones	125.975	254.300	Super High
Kankakee	120.125	256.800	Low
Kankakee	132.500	258.100	Low
Kankakee	118.225	353.550	High
Maple Park	127.075	299.700	Low
Milford	126.725	351.950	High
Milwaukee	125.100	323.100	Low
Milwaukee	132.300	360.600	Low
Moline	135.825	385.650	High
Monee	133.425	360.750	Super High
Muskegon	132.275	254.350	High
Oshkosh	127.000	387.100	Low
Oshkosh	132.100	319.250	Low
Ottumwa	118.150	354.100	Low
Pullman	128.500	269.600	Low
Rantoul	120.175	377.200	Super High
Roberts	134.025	248.400	High
Rockford	133.000	379.200	Low
Rossville	125.375	370.850	Low
Rossville	120.975	343.950	Super High
South Bend	127.625	273.600	High
Volk field	125.050	269.650	Low
Washington	125.575	385.600	high
Washington	134.325	239.300	Super High
Washington	128.525	297.400	Super High

Military UHF Frequencies

228.950 Ada Bison MOA* Kansas Primary
230.400 Indiana ANG**178th FG Channel 14 R5503 and Brush Creek MOA Air to Air TAC
249.150 Lambert Field/St. Louis, MO-110th TFS MO ANG Air Tact. MOGAR MOA Air-to-Air
254.250 Hulman Regional Field Indiana - Indiana ANG 181st Fighter Group Red Hills MOA Operations
257.900 USAF/ANG Operations in the Howard MOA (Central IL- Kansas City ARTCC)
259.400 USAF/ANG Operations in the 12 Mile/Hilltop - MOA (NW Indiana)
269.400 IR-110 Exit/VR-1195/Pecos MOA ZAB*** ARTCC Contact
282.200 Brownwood MOA Texas Loon Range
283.775 AR-640 A/B MOA over Lake Michigan/Minnow MOA Brochure Secondary

*MOA - Military Operations Area; **ANG - Air National Guard
***ZAB - Albuquerque ARTCC

See you in the comics

It's that time of year again for some aero/ATC funnies! Our contributor today is Robby, a controller friend who wanted to share "controller humor" with us.

A Huey Cobra practicing auto rotations during a military night training exercise had a problem and landed on the tail rotor, separating the tail boom. Fortunately, it wound up on its skids, sliding down the runway doing 360s (complete circles) in an brilliant shower of sparks. As the Cobra passed the tower, the following exchange was overheard: Tower - "Sir, do you need any assistance?" Cobra - "I don't know, Tower. We ain't done crashin' yet!"

The controller working a busy pattern told the 727 on downwind to make a 360 (usually to provide spacing between aircraft). The pilot of the 727 complained, "Do you know it costs us two thousand dollars to make a 360 in this airplane?" Without missing a beat, the controller replied, "Roger, give me four thousand dollars worth!"

PSA was following United, taxiing out for departure. PSA called the tower and said "Tower, this is United 586. We've got a little problem, so go ahead and let PSA go first." The tower controller promptly cleared PSA for takeoff before United 586 had a chance to object to the impersonation!

A DC-10 had an exceedingly long landing rollout after landing with his approach speed just a little too high. The local (tower) controller told the pilot, "American 751 Heavy, turn right at the end if able. If not able, take the Guadeloupe exit off of Highway 101 back to the airport!"

A male pilot is a confused soul who talks about women when he's flying and about flying when he's with a woman.

It was a really nice day, right about dusk, and a Piper Malibu was being vectored into a long line of airliners in order to land at Kansas City: KC Approach - "Malibu three-two-Charlie, you're following a 727, at one o'clock and three miles." Three-Two-Charlie - "We've got him. We'll follow him." KC Approach - "Delta 105, your traffic to follow is a Malibu, eleven o'clock and three miles. Do you have that traffic?" Delta 105 (long pause and then in a thick southern drawl) - "Well....I've got something down there. Can't quite tell if it's a Malibu or Chevelle, though."

Tower: "Eastern 702, cleared for takeoff, contact Departure on 124.700." Eastern 702: "Tower, Eastern 702 switching to Departure...by the way, as we lifted off, we saw some kind of dead animal on the far end of the runway." Tower: "USAirways 635, cleared for takeoff, contact Departure on 124.700....did you copy the report from Eastern?" "USAirways 635, cleared for takeoff... and yes, we copied Eastern and we've already notified our caterers!" (*I've always wondered about their food! jb*)

Thanks, Robby! That's all for now; see you next month. Until then, 73 and out.

Ken Reitz, KS4ZR
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Listening to Major League Baseball

There is a peculiar rhythm in the sound of a baseball game on the radio. Like the progress of the game itself, the delivery is slow yet filled with an intangible tension, the crowd noise in the background, the deliberate pauses in the announcers' narration. And, in an instant, the spell is broken with the unmistakable crack of a wooden bat colliding with a major league fastball.

The best baseball on radio is a personal affair. The play-by-play announcer has to speak directly into the ear of the listener to trigger the sensation of virtually being there. And the best announcers do this well, adding their own idiosyncracies of voice and nuance of talent. That's why there's only one Jon Miller, Ernie Harwell, Jack Buck, Vin Scully or Skip Caray.

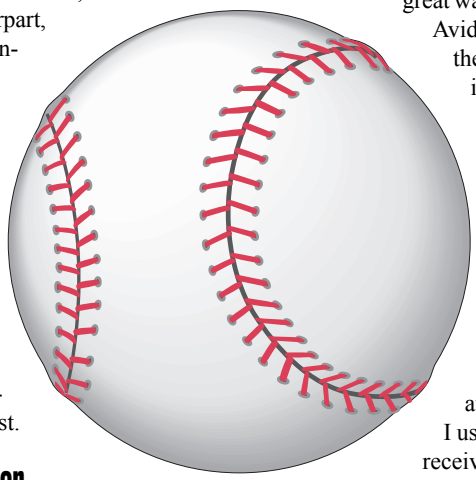
This year there are 30 Major League Baseball teams all playing a 162 game schedule and, while many of those games will be shown on network, cable, or individual TV stations, every single one of the thousands of games will be broadcast on radio. Even the most down-and-out of baseball's millionaire owners can't do without a radio connection for their team. And, despite the emergence of computer driven Internet radio broadcasts, this is a sport where radio is still king.

❖ Back to the Future

In 1921 radio was the future of communications and it wasn't long after Pittsburgh's KDKA took to the airwaves on August 5 of that year, with the first official broadcast of a game, that America's affection for baseball on the radio took hold. Crystal set radios were the hi-tech hardware of the day. Those who couldn't spring for the $25 price tag could build their own from dozens of plans published every month in a stack of popular radio magazines. As the decades passed and broadcast technology improved, avid baseball fans found they could tune in games being played not just in their own cities, but across the country.

Tradition is the stock of baseball and there's a deep sense of tradition in the lineage of baseball's broadcast heritage. KDKA still broadcasts the Pittsburgh Pirates. In Chicago WGN has been broadcasting Cubs baseball nearly every year since 1924. KMOX has carried the Cardinals since before World War II. Listening to games on those venerable old stations has been as reliable as the arrival of spring and Opening Day itself. For some teams new traditions are just now starting as with the Colorado Rockies flagship station KOA, Denver, or the Tampa Bay Devil Rays and WFLA, Tampa.

It was inevitable that baseball would finally end up on the FM band. With its clear audio reproduction, no fading or atmospheric noise, FM is a baseball/radio fan's dream. Most major league team networks include many FM outlets among their affiliates. Still, FM, unlike its AM counterpart, doesn't allow distant listening, which is why it's advantageous to have all those old 50,000 watt clear channel stations carrying the flag for their teams. No doubt the next step up the radio evolutionary ladder will be satellites. Look for many games to be heard next year on XM or Sirius satellite radio channels coast to coast.



❖ The Internet Connection

The advent of the Internet has made a profound change in fans' participation in their team's progress. Not only does every team have a well designed web site (see Table One), but fans from all over the world can tune into the game in progress directly from each team's home page. Of course, you still need a decent computer to do this and so far it's not practical to listen in a portable mode. That means there's still room for old-style radio broadcasts.

What the Internet also adds is an instant deluge of team data. On each web site fans can check out last night's box score, tonight's game line-up, latest news from the front office, photos, interviews, even prerecorded video and audio clips. Fans can send E-mail to their favorite players, check out press releases from the team's PR office or even order tickets on-line.

Most Major League web sites have the complete radio and television network affiliate list available, often buried under headings such as "Game," "Schedule," "Media" or "Press box." Check the site map first to navigate your way around the site.

❖ Tuning In

Some of the best AM radios made are car radios. Who hasn't enjoyed listening to a baseball game on a distant radio station from the comfort of the front (or back) seat of a car? Last year, during the World Series, I happened to be on the road during one of the night games and enjoyed switching from WABC New York, for the Yankees' perspective, to WSB Atlanta for the Braves' perspective. It was a great way to listen to the game.

Avid AM DXers know that the best radios for tuning in baseball action are the pricey shortwave radios many *MT* readers already have. Their sensitive tuning sections and low noise amplifier stages, coupled with a good outdoor antenna make radio listening a real pleasure at night on these radios. I use the general coverage receiver in my Kenwood HF transceiver. By adding a good Hi-Fi speaker I can get fairly decent game audio.

You never know which radio is going to turn out to be a great AM DX machine. I've had success tuning in baseball games on everything from a Uniden 2021, a junk shelf 30 year old Radio Shack receiver, to a 1936 RCA Victor with original tubes. The most important thing is to have a good outdoor antenna and turn off any dimmer switches or appliances in the house which can generate noise in the AM frequencies.

Nearly all team flagship stations are putting out 50 kW though there are some notable exceptions. Tampa's WFLA, Kansas City's KMBZ, Miami's WQAM, Oakland's KABL, Arizona's KTAR, San Diego's KOGO, are all only 5 kW. The Brewer's WTMJ drops to 10 kW and the Marlin's WQAM drops to 1kW at night. The Dodgers' KXTA runs 5 kW during the day and goes to 44 kW at night.

The hardest stations to catch will be the West coast stations if you're on the East coast and vice versa. But, probably the rarest of all will be the Arizona Diamondbacks' Spanish language station KPHX with 1 kW daytime and .5 kW at

night. Six teams have Spanish language flagship stations. If you speak English and happen to be an Expos fan you'd better start learning French. The games heard on their flagship station CKAC are in French only. They have no English broadcast outlets.

The National League's Atlanta Braves have the biggest affiliate station list with 166, including nine states and the U.S. Virgin Islands. The American League honors go to the Kansas City Royals with 74 affiliates. The smallest network is the NY Mets' with five. For the American League it's the Anaheim Angels with 13. And the Los Angeles Dodgers have special honors offering not only English and Spanish broadcasts, but Korean as well. Korea has enjoyed a long tradition of baseball, their Little League teams winning numerous Little League World Series' over the last few decades. However, only recently have Korean players made it to the "Big Show." Now Korean fans in the L.A. area can tune into Dodgers play-by-play in their native language via KYPA, 1230 AM.

Check out the following list and see how many teams you can catch. Listen for the voices of today's broadcast legends and, for a real treat, build a crystal set and tune in the way your grandfather might have in the early 1930's. My deep appreciation to the Broadcast and Media Relations staffs of the 30 participating Major League Baseball teams for making available the information in Table One.

TABLE ONE

MAJOR LEAGUE BASEBALL FLAGSHIP STATIONS

*indicates Spanish flagship station

Team, Flagship Call Letters, Frequency, Announcers, Web Site

American League East

Baltimore Orioles WBAL 1090 Jim Hunter, Fred Manfra **www.theorioles.com**
Boston Red Sox WEEI 850 Joe Castiglione, Jerry Trupiano **www.redsox.com**
New York Yankees WABC 770 **www.yankees.com**
Tampa Bay Devil Rays WFLA 970 Paul Olden, Charlie Slowes **www.devilrays.com**
*Tampa Bay Devil Rays La Mera Mera 760 Ricardo Tavares, Enrique Oliu
Toronto Blue Jays CHUM 1270 **www.bluejays.com**

American League Central

Chicago White Sox WMVP 1000 John Rooney, Ed Farmer, Bill Melton **www.whitesox.com**
Cleveland Indians WTAM 1100 Tom Hamilton, Matt Underwood **www.clevelandindians.com**
Detroit Tigers WJR 760 Ernie Harwell, Jim Price, Dan Dickenson **www.detroittigers.com**
Kansas City Royals KMBZ 980 Denny Matthews, Ryan Lefebvre **www.kcroyals.com**
Minnesota Twins WCCO 830 Herb Carneal, John Gordon **www.twinsbaseball.com**

American League West

Anaheim Angels KLAC 570 (KIK-FM 94.3, KCTD 1540 when conflict with L.A. Lakers)
*Anaheim Angels XEPRS 1090
Oakland Athletics KABL 960 Bill King, Ken Korach, Ray Fosse **www.oaklandathletics.com**
Seattle Mariners KIRO 710 Dave Niehaus, Rick Rizzs **www.mariners.org**
Texas Rangers KRLD-AM 1080 **www.texasrangers.com**

National League East

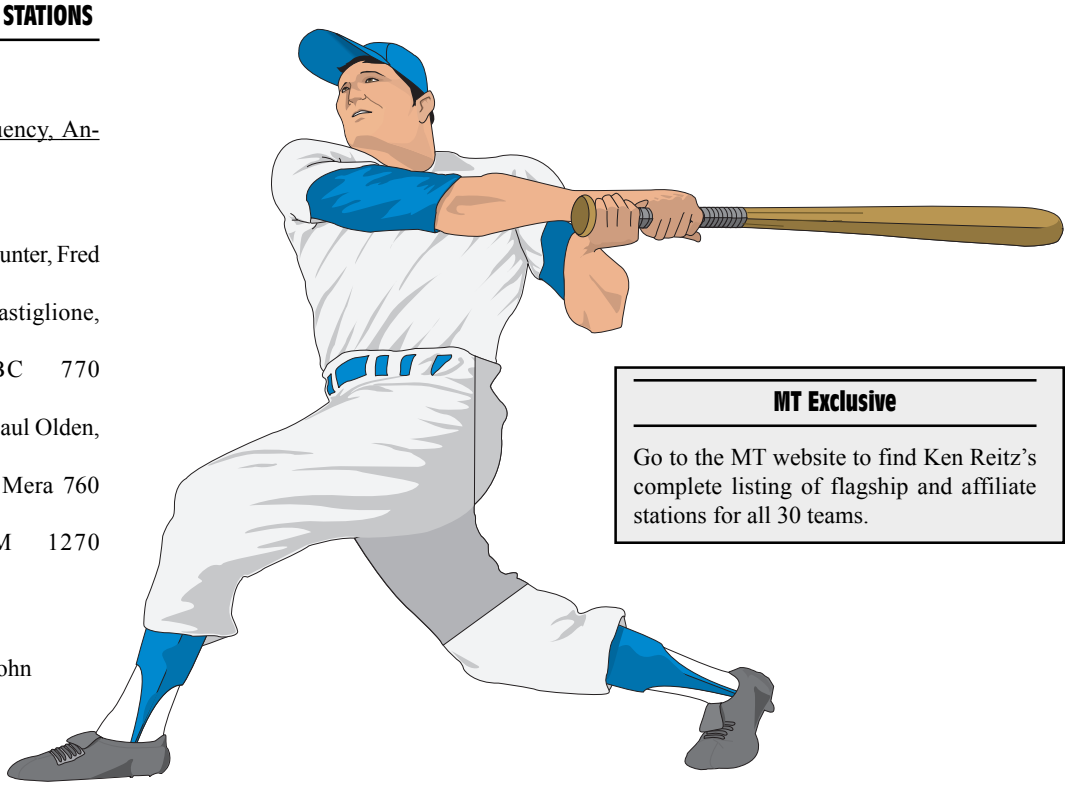
Atlanta Braves WSB 750 Skip Caray, Pete Van Wieren **www.atlantabraves.com**
Florida Marlins WQAM 560 **www.flamarlins.com**
*Florida Marlins WQBA 1140
Montreal Expos CKAC 730 Jacques Doucet, Rodger Brulotte **www.montrealexpos.com**
New York Mets WFAN 600 **www.nymets.com**
Philadelphia Phillies WPHT 1210 Harry Kalas, Andy Musser **www.phillies.com**

National League Central

Chicago Cubs WGN 720 Pat Hughes, Ron Santo **www.cubs.com**
Cincinnati Reds WLW 700 Marty Brennaman, Joe Nahall **www.cincinnatireds.com**
Houston Astros KTRH 740 **www.astros.com**
Milwaukee Brewers WTMJ 620 Bob Uecker, Jim Powell **www.milwaukeebrewers.com**
Pittsburgh Pirates KDKA 1020 Lanny Frattare, Steve Blass **www.pirateball.com**
St. Louis Cardinals KMOX 1120 Jack Buck, Mike Shannon, Joe Buck **www.stlcardinals.com**

National League West

Arizona Diamondbacks KTAR 620 Greg Schulte, Rod Allen **www.azdiamondbacks.com**
*Arizona Diamondbacks KPHX 1480
Colorado Rockies KOA 850 Wagne Hagin, Jeff Kingery **www.coloradorockies.com**
Los Angeles Dodgers KXTA 1150 Vince Scully, Ross Porter, Rick Monday **www.dodgers.com**
*Los Angeles Dodgers KWKW 1330 Jaime Jarrin, Pepe Yniguez
+Los Angeles Dodgers KYPA 1230 Korean language (selected games)
San Diego Padres KOGO 600 Jerry Coleman, Ted Leitner **www.padres.com**
*San Diego Padres KURS 1040 Eduardo Ortega, Rene Mora
San Francisco Giants KNBR 680 Jon Miller, Ted Robinson, Duane Kuiper **www.sfgiants.com**
*San Francisco Giants KZSF 1370 Amaury Pi-Gonzales, Erwin Higuaros



MT Exclusive

Go to the MT website to find Ken Reitz's complete listing of flagship and affiliate stations for all 30 teams.

Doug Smith, W9WI
w9wi@bellsouth.net

More Low Power FM

The new LPFM service I reported on in April continues to be controversial. I have not yet received word of any move to bring the Oxley bill (which would rescind the creation of LPFM) to a vote in the full Congress, but it does continue to receive attention in subcommittee. It also receives plenty of attention among FM DXers; it's the most controversial issue to come along in years. Virtually all DXers agree LPFM will hurt FM DX, but some believe the service is necessary and should exist anyway. Others agree with the NAB, that LPFM will interfere with the regular service of local stations and shouldn't be allowed.

An unusually blunt statement appeared on the FCC website in late March. Dale Hatfield, Chief of the Office of Engineering and Technology, and Roy Stewart, Chief of the Mass Media Bureau, expressed concern that the National Association of Broadcasters (NAB) has been attempting to mislead Congress. The statement refers to a CD NAB has been distributing that alleges to demonstrate the interference LPFM will cause. The Commission replies that the interference heard on the CD was generated artificially, and does not reflect the way interference actually works on the FM band. Read the statement for yourself at

http://www.fcc.gov/Bureaus/Engineering_Technology/News_Releases/2000/nret0005.html.

Also on the LPFM front, a five-stage filing window has been announced for applications. The states and territories have been divided into five geographically-diverse groups. (For example, group #2 includes Colorado, Delaware, Hawaii, Idaho, Missouri, New York, Ohio, South Carolina, South Dakota, Wisconsin, and American Samoa.) Anyone wishing to locate a LPFM transmitter in one of these states must apply during the five-day filing window for the group that state is in. The order in which the groups' filing windows will open will be determined by random selection. Once this order is determined, an announcement will be made of the date of the first filing window, at least 30 days in advance. The FCC expects to open filing windows at 90-day intervals, which would result in the original batch of 100-watt LPFM applications being taken over a 1-year period. Applications for 10-watt LPFMs won't be accepted until the 100-watt applications have been resolved.

❖ Bits and Pieces

• Here's something that doesn't happen every day: a new three-letter callsign has been assigned. Back in the early 1980s, the owners of KHJ-930 and KHJ-TV decided to sell their stations to two separate companies. Under FCC regulations, one of the stations had to change its call; the AM station added a K, becoming KKHJ. That caused a problem, though. KKHJ broadcasts in Spanish, and the pronunciation of the letters "KK" in Spanish is the same as a common Spanish-language obscenity. (They worked around the problem by giving the calls in English.) The station succeeded in getting the FCC to waive its normal policy, and reassign the old KHJ calls.

There have been some changes to the FCC's database search on http://svartifoss.fcc.gov:8080/prod/cdbs/pubacc/prod/sta_sear.htm. Here's the result of a search on WSM-650:

Federal Communications Commission

FCC Home Page | Search | Commissioners | Bureaus/Offices | Finding Info

Help | Home

Station Search Details

Call Sign:	WSM
Facility Id:	74066
Community of License:	NASHVILLE, TN
Service:	AM
Fac Type:	UNKNOWN
Status:	LICENSED
Status Date:	
Frequency:	650
Channel:	
Lic Expir:	08/01/2004
Licensee:	NEW GAYLORD ENTERTAINMENT COMPANY
Address:	ONE GAYLORD DRIVE
Address 2:	
City:	NASHVILLE
State:	TN
Zip Code:	37214
Call Sign History	View Call Sign History

In Canada, there were only two three-letter callsigns issued to private broadcasters: CKX-1150 in Brandon, and CKY-580 Winnipeg. Soon, there will only be one. CKX has been granted permission to move to 101.1 FM, and has been assigned the call letters CKXA-FM for the new station. The FM station is already on the air. CKX-AM will be allowed to simulcast it for a few months; then, 1150 – and a piece of Canadian broadcasting history – will go silent.

• David Parsons of Tucson is another reader who's done some daytime DXing. David heard two Los Angeles AM stations in broad daylight at Cascabel, 40 miles east of Tucson and 465 miles east of Los Angeles. He was thinking it must have been groundwave because of the time of day, but asks "Or could the low sun angle at the near equinox time have helped a sky wave?"

I have to think that's possible. There are many reports of unusual long-distance daytime reception in mid-winter, some of which I've observed myself.

David also asks whether there's a web site that would provide a topographic (elevation) map of the terrain between Cascabel and Los Angeles. I don't know of one, but I'd be interested in such a thing too – if you know where to find one, please let us know. I should say, I don't think the terrain would significantly affect the long-distance propagation of AM signals, though the *geology* of the terrain certainly would. (This 465-mile reception would not be DX if the intervening territory was salt water instead of mountains and desert!)

• George Appleton wrote in to elaborate on his "Slinky" antenna. The "induction coil" used to couple the signal into the radio is roughly 30-ft of wire (the amount is not critical) wound loosely around a can. (Pop, beer, soup, whatever.) The can is then removed. The last few turns are used to bind the coil, and it's flattened into an oval shape. You then tune in a weak station, and move the coil around for best results.

George uses it with a Slinky, but he got the idea from a friend who wrote a newsletter for RV owners. Good AM reception is difficult inside a metal box! The original antenna used a single 50-ft piece of wire. 15 feet was left outside the RV; 32 feet made the coil; and the remaining 3-ft section was grounded (if necessary) to the window frame. This idea may also be helpful for those trying to listen from inside a metal office building or college dorm. (By the way, I'm seeing ads for Slinkys (Slinkies?) on TV again. It looks like we'll have a supply of these unusual antenna parts for some time to come, hi!)

We're at the peak of the FM/TV DX season. (If we have a good one, I expect to log my 1,000th FM station this year) Are you hearing/seeing anything interesting? Please write: Box 98, Brasstown NC 28902-0098, or by email to *w9wi@bellsouth.net.* Good DX!

OUTER LIMITS

THE CLANDESTINE, THE UNUSUAL, THE UNLICENSED

George Zeller
George.Zeller@acclink.com

Clandestine Radio Web Sites Reinvigorated

The world's two best clandestine radio DX web sites just got better. Nick Grace, the driving force behind *Clandestine Radio Intel*, has introduced a major upgrade to this amazing resource. The award-winning web site, found at **www.qsl.net/yb0rmi/cland/** on your internet dial, now provides political background and DX information for shortwave clandestines all over the world. Spiffy graphics, an easy to navigate site, and an enormous volume of clandestine radio content is on this site.

Germany's Martin Schöch, the editor and author of *Clandestine Radio Watch*, has also refocused his internet service. At the **www.swl.net/swl-de/swl-cla.html** URL, CRW's monthly digest of worldwide clandestine radio loggings is the standard reference in the field. Martin no longer sends out CRW via e-mail, but all issues for the last three years are available for free on the web site.

Nick and Martin are superb examples of how the internet and shortwave radio are moving toward a new information synergy. Even if you're not a clandestine station DXer, you'll be fascinated by the content on these sites.

❖ New ACE Publisher

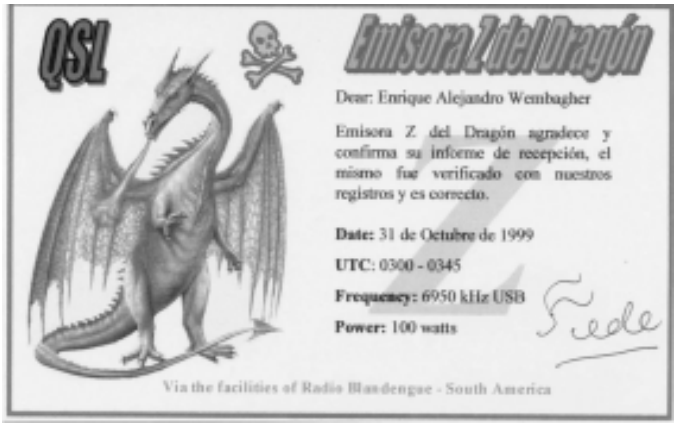
Well known DXer and broadcaster Pat Murphy has stepped down as President of the Association of Clandestine radio Enthusiasts, along with Managing Editor Steve Rogovich. Pat and Steve say that they "had a ball" in their years at the helm of North America's largest unlicensed broadcast DX club, but demands of work and family have caused them to take a breather. Pat increased ACE membership, forged an alliance with John Cruzan's excellent *Free Radio Network* web site at **www.frn.net/** and strengthened the content of the club's monthly publication, *The ACE*.

ACE has not yet announced a permanent President and Publisher, but longtime pirate radio advocate John T. Arthur is serving on an interim basis as the club works to fill Pat's shoes. Memberships, still $21 in the USA, $26 in Canada, and $40 elsewhere, go to the new ACE address at 7994 Route 19, Belfast, NY 14711.

❖ What's on the Air

Warmer weather with longer daylight hours did not distract *MT* readers. Lots of North American shortwave pirates remain active in the summer; let us know what you have logged! Most stations operate within 10 kHz of 6955 kHz, but it pays to tune around the band. Other good places to check for daytime pirate activity include13910 kHz and the 15000-15100 kHz area. Station programming formats and contact maildrops are shown here:

Blind Faith Radio- Dr. Napalm has the only consistent classic rock format on shortwave radio. (Merlin)
KMUD- Their west coast music is a superb DX catch on the east coast. (Lone Pine)
KRMI- Radio Michigan International combines rock and comedy. (None)
Jolly Green Radio- In the same genre as **Green Acres Radio**, they kick dead horses until they are really, really dead. (None)
Psycho Radio- A new one with a "dead end radio" slogan. (None)
Radio Azteca- Bram Stoker's funny original comedy is all about DXing. (Belfast)
Radio Bingo- The winner of all their games is the interim publisher of ACE. (uses radiobingo@chek.com e-mail)



South American Pirate DX

RBCN- Radio Bob's lengthy shows are still entertaining. (Lula)
Reefer Madness Radio- They use drama for marijuana advocacy. (Belfast)
Crazy Celt- DJ Shadow's new station features hip hop music. (None)
Radio Tornado Worldwide- Radio Metallica has been strangely silent, but its parody station still lives. (None)
Voice of Captain Ron Shortwave- Sometimes their music is now heard in AM mode. (uses captainronswr@yahoo.com e-mail)
Voice of Pancho Villa- Jerry Coatsworth heard Pancho's wild ride at the Fest from hundreds of miles away. (Blue Ridge Summit)
Voice of the Inky Pen- They are a parody of other intentionally bad pirates. (None)
Voice of Prozac- Most pirates use upper sideband, but The Relaxation Station usually uses AM. (Pittsburgh)
WHYP- The most active pirate of 1999 is back in 2000.(uses whyp1530@yahoo.com e-mail)
Winter SWL Festival- More than two dozen stations got low power relays at the Fest last March; we don't have room for all of them.
WLIS- Jack Boggan is the world's only interval signal DJ. (Blue Ridge Summit)
WMFQ- If you don't get a QSL from this one, you just didn't send a report. (Providence)
WMOE- The call letters are from their Three Stooges theme music. (uses wmoe6955@yahoo.com e-mail)
WPN- We don't yet know if this is a new or reactivated station. (None yet)
WRX- Jimmy the Weasel is back with his famous blunt wit and a new address. (Wilton)

❖ Reports and QSLs

Reception reports to pirate stations require three first class stamps for USA maildrops or $2 US to foreign addresses. Send your letters to PO Box 1, Belfast, NY 14711; PO Box 28413, Providence, RI 02908; PO Box 109, Blue Ridge Summit, PA 17214; PO Box 29, Wilton, ME 04294; PO Box 24, Lula, GA 30554; PO Box 293, Merlin, Ontario N0P 1W0; PO Box 928, Lone Pine, CA 93545; PO Box 25302, Pittsburgh, PA 15242; . Some stations verify logs in *The ACE*, *Free Radio Weekly* (free to contributors via yukon@mdn.net), or via the *Free Radio Network* web site (see above). The rest solicit reception reports via postal or e-mail addresses noted here.

❖ Thanks

Your input is always welcome via PO Box 98, Brasstown, NC 28902, or via the e-mail addresses atop the column. This month's contributors include T. J. Arey, Beverly, NJ; John T. Arthur, Belfast, NY; Shawn Axelrod, Winnipeg, Manitoba; Ranier Brandt, Hoefer, Germany; Jerry Coatsworth, Merlin, Ontario; Steve Coletti, New York, NY; Ross Comeau, Andover, MA; Nick Grace, Washington, DC; Joe Filipkowski, Providence, RI; Harold Frodge, Midland, MI; Randy Gillosa, Ottawa, Ontario; Raul Gonzalez, Santiago, Chile; Frank Grelle, Mt. Carmel, CT; Paul Griffin, Berkeley, CA; Sheldon Harvey, Montreal, Quebec; William T. Hassig, Mt. Prospect, IL; Roger Henderson, Memphis, TN; Dave Kirby, Willowick, OH; Greg Majewski, Oakdale, CT; Bill McClintock, Minneapolis, MN; Pat Murphy, Chesapeake, VA; Pat Nobel, Monroe, MI; Mke Prindle, New Suffolk, NY; Tim Rahto, Baltimore, MD; Steve Rogovich, Virginia Beach, VA; Martin Schöch, Merseburg, Germany; Lee Silvi, Mentor, OH; Paul Smith, Bradenton, FL; Bud Stacey, Setsuma, AL; DJ Stevie, Basel, Switzerland; Vladimir Titarev, Kremenchuk, Ukraine; and Niel Wolfish, Toronto, Ontario.

Kevin Carey, WB2QMY
lowband@gateway.net

Catching Up

One of the biggest challenges to writing a monthly column is deciding what *not* to include. Rarely do I have trouble filling a page: Usually I must (regretfully) omit some things to fit the constraints of a one-page limit. This month, I'll present an assortment of loggings and news that I've been holding onto over the past few issues. This will give these contributions the attention they deserve, and allow me to "catch up" on column topics.

❖ Loggings

Our loggings this month come from three contributors. First, with a rather large list, is *MT*'s own Jacques d'Avignon, VE3VIA. Jacques monitors from Peterborough, ON with a Kenwood R-5000 and a Wellbrook Communications ALA 100 wire loop. The circumference of the loop is 100 ft and it is suspended between two trees in an East-West direction. (See loop review in April '00 *MT*.)

I'm also pleased to welcome newcomer Dean Burgess (MA). Dean uses a Drake R8B with an Eavesdropper dipole to make his longwave loggings. Finally, Dave Hughes (MO) submitted a nice assortment of logs from the U.S. heartland. Dave uses a Sangean ATS-818CS with an 80 foot antenna. He notes that the wire antenna is only slightly better than the Sangean's built-in ferrite rod antenna.

❖ Selected LF Loggings

Freq.	ID	Location	By
12.6	--	Russia (Alpha Pulses)	J.D. (ON)
53.5	DCF55	Franfurt, Ger.	J.D. (ON)
62.6	FTA	Paris (Fr. Navy Station)	J.D. (ON)
162	--	Alloius, France (BCST)	J.D. (ON)
189	--	Iceland (BCST)	J.D. (ON)
209	MT	Chibougamau, QC	J.D. (ON)
220	BX	Blanc Sablon, QC	J.D. (ON)
230	SH	Shreveport, LA	J.D. (ON)
258	ORJ	Corry, PA	J.D. (ON)
260	ESG	Rollinsford, NH	D.B. (MA)
263	LXT	Lee's Summit, MO	D.H. (MO)
266	YZX	Greenwood, NS	J.D. (ON)
269	TOF	Beverly, MA	D.B. (MA)
271	GV	Kansas City, MO	D.H. (MO)
284	GPH	Mosby, MO	D.H. (MO)
323	UWP	Argentia, NF	J.D. (ON)
326	FO	Topeka, KS	D.H. (MO)
335	CNK	Concordia, KS	D.H. (MO)
338	JZ	Lawrence, KS	D.H. (MO)
339	YFT	Makkovik, NF	J.D. (ON)
343	ZBM	East Farnham, QC	J.D. (ON)
344	MK	Kansas City, MO	D.H. (MO)
346	LI	Boston, MA	D.B. (MA)
347	Z8	Riviere Ouelle, QC	J.D. (ON)
353	LLX	Lyndonville, VT	J.D. (ON)
356	SUH	Rockland, ME	J.D. (ON)
356	AY	St Anthony, NF	J.D. (ON)
358	OG	Ogdensburg, NY	J.D. (ON)
359	DO	Kansas City, MO	D.H. (MO)
367	IMR	Marshfield, MA	D.B. (MA)
368	IX	Olathe, KS	D.H. (MO)
375	CHT	Chillicothe, MO	D.H. (MO)
375	JRV	Morrisville, VT	J.D. (ON)
375	BO	Boston, MA	D.B. (MA)
379	FSK	Fort Scott, KS	D.H. (MO)
379	DL	Duluth, MN	J.D. (ON)
379	BRA	Asheville, NC	J.D. (ON)
379	IVV	Lebanon, NH	J.D. (ON)
380	LQ	Boston, MA	D.B. (MA)
382	LQ	Boston, MA	J.D. (ON)
383	TST	Unknown,	J.D. (ON)
386	D8	Dolbeau, QC	J.D. (ON)
391	DDP	San Juan, PR	J.D. (ON)
394	EZZ	Cameron, MO	D.H. (MO)
394	OR	Chicago, IL	D.B. (MA)
400	TRX	Trenton, MO	D.H. (MO)
420	PK	Unidentified	D.H. (MO)
450	PPA	Puerto Plata, DOM	J.D. (ON)
517	GQ	Kansas City, MO	D.H. (MO)
522	GF	Unknown	J.D. (ON)
524	UOC	Iowa City, IA	J.D. (ON)
526	OJ	Olathe, KS	D.H. (MO)

❖ High-Tech Logging

Looking for a good logging program for your computer? You might want to consider NDBLOG produced by Stan Forsman (CA). To my knowledge, this is the only logging program specifically designed for beacon hunters. I recently had the opportunity to evaluate version 7.4 of the program and I was impressed with its array of features.

Although NDBLOG is designed for use on DOS-based computers, Windows can restart their computers in MS-DOS mode and run the program with no problems. Unfortunately, the program is not available for use on a Macintosh at this writing.

NDBLOG stores up to 9,999 loggings, and includes columns for over 20 parameters. Below is a sampling of some of the logging fields included in NDBLOG:

ID	Location (City, State, Country)
Frequency	Elevation
Date Heard	Transmitter Power
Time Heard	Latitude/Longitude
Service Type (Marine, Aero, etc.)	Distance (Miles or Kilometers)
ID Type (Plain, DAID, 50/10, etc.)	Miles-per-Watt
ID Length	QSL Address
ID Cycle Time	Miscellaneous

A feature I found to be especially helpful is the program's ability to automatically calculate the distance to an NDB based on your own latitude and longitude. No more running to the atlas with ruler in hand for every DX catch!

NDBLOG is available for $15.00 (US funds), plus $4.95 shipping in the US. It may be ordered from Stan Forsman, 515-A Westchester Drive, Campbell, CA 95008-5046. Telephone inquiries are welcome at 408-879-9604 Tuesday through Friday, 9am to 5pm PST; Saturday, 10am to 2pm PST. For more details on NDBLOG, surf to **www.aimnet.com/~caengrav/ndblog/**. There you'll find an expanded description of the program and an e-mail address for product inquiries.

❖ A Souped-up Loop

Dick Pearce (VT) sent along some pictures of his remotely-tuned, remotely-turned homespun loop. Dick took the basic loop design we published here back in September 1992 and added some impressive refinements. He started with a sturdy outdoor mounting frame, and then added a servo motor, remote direction indicator and remote tuning control. Perhaps we can get Dick to write up something for MT readers who wish to build an outdoor loop of their own. Figure 1 shows the finished loop at Dick's station.

A homebuilt frame highlights Dick Pearce's remote control outdoor loop.

❖ Summer Reading

Speaking of loops, a new book by Joe Carr deals extensively with this subject. *The Loop Antenna Handbook* is a 133 page guide loaded with loop building theory and techniques. Considering the popularity and benefits of loops for MF and LF work, beacon chasers will definitely want to check out this recent arrival.

The Loop Antenna Handbook is available for $19.95 + shipping & handling from Universal Radio, Inc., 6830 Americana Pkwy, Reynoldsburg, OH 43068-4133. Telephone orders may be placed at 800-431-3939.

Ike Kerschner, N3IK
email: n3ik@hotbot.com

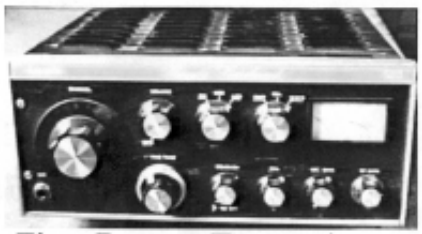
Beacon Peekin'

Amateur Radio beacons have been around for many year. Essentially they are devices to enable hams to know when a particular band is open to a given area.

Beacon hunting can be fun. I find particular pleasure in tuning beacons on ten, six and two meters. There are, of course, beacons on other bands, but the VHF beacons are what we will concentrate on this month. We will include ten-meter beacon info because it is the beginning of VHF frequencies and ten is affected by many of the same propagation phenomena that enhance propagation on VHF.

Beacons normally transmit CW signals at low power. I am not familiar with any beacons transmitting in any other mode, and would appreciate hearing from anyone who has knowledge of digital or phone modes.

The beacon owner may have several different set-ups for operation. While most beacons simply transmit a signal to alert operators to propagation conditions on the band, some beacons may switch power levels, or/and antennas (i.e. vertical to horizontal). Of course all of this is to define the level of usefulness of the band at a given time.



First Beacon Transmitter

Current Beacon Setup

Confirming reception with	Date DD	MM	YY	UTC	

❖ Where Can I Find Beacons on VHF?

On ten meters beacons are located between 28.190 and 28.225 for manually controlled beacons. Automatic beacons (no control operator present) are located between 28.200 and 28.300. The six-meter beacon band is between 50.060 and 50.080. And two-meter beacons are between 144.275 and 144.300.

❖ Build Your Own Beacon?

Building your own beacon can be as easy or complex as you wish. For example, for two years I operated a beacon on two meters that ran one-half watt power to a pair of stacked turnstile antennas. I sent my message with a simple perforated tape driven by a small motor. During the two years the beacon was on the air I received QSL cards from over 100 hams who copied the beacon. A lot of mail asked about the beacon and thanked me for making it available.

Today options for control are numerous, from the perforated tape loop to computer control. Most use memory keyers, and some will change messages from time to time. Power is usually five watts or less and the message will normally be call sign/b with power level, antenna type, location/grid square and QSL information, and email address.

Every beacon operator I know loves to get reports on his/her beacon and will answer you at length for your QSL card.

❖ The N7LT Beacon Station

I copied N7LT beacon on ten meters (28.248.5MHz.) a while back and received a nice reply from the owner/operator Lyndel.

N7LT beacon message is VVV de N7LT/bcn DN45 Bozeman, MT. QSL SASE or email to *N7LT@arrl.net*. VVV de N7LT/bcn DN45 Bozeman, MT. Ant _ wave gp. Tx 5w, _ wm 50 mw ar then repeats.

Lyndel went on to give details of his beacon stating the antenna is a converted CB ground plane 15 feet above ground and the transmitter is a Hy-gain Cybernet CB board converted to 10 meters.

He has a second beacon on six meters which may be operational at this time made from the same Hy-gain CB board. Frequency will be 50.073 a third beacon from N7LT will be on 144.300.

Lyndel states that the beacon is more fun than all of his repeaters and remotes put together. It is the emails, letters and QSLs that make it so enjoyable. He built the beacons entirely from available (junk) parts and is having a ball with them.

Try this beacon hunting stuff, it's fun and informational!

❖ Summer Plans

June is traditional Field Day and VHF contest month. Hope all of you are planning to be active on these great event weekends.

Here at N3IK we will be spending several periods of operating from remote locations with our QRP rigs. I hope this year to be active as a Bumblebee in the Adventure Radio Societies "flight of the bumblebees) coming up in July (details next month). I have two canoe camping trips planned and several Mountain bike trips. If you should work me, the QSL will be a photo of the location.

I am gathering parts for a kite and hope to use it for an antenna platform on some of my trips. I have used a kite several times in the past and am always impressed with the results a truly high antenna can provide.

This particular kite in *QST* is a high performance kite and should provide superb results. Cost of building the kite is minimal and construction appears to be very simple. If you decide to try a kite-lofted antenna, do use caution in several areas: first, electric lines must be avoided at all costs; second, use gloves when flying as the line can give serious cuts. Also, notify the local FAA office and if you fly it after dark you must use a strobe. It is also wise to provide static protection in form of a spark gap for the antenna to avoid damage to the rig.

I am semi-retired and hope to be a lot more active than previous summers, although present workload seems anything but retired! Have fun and keep me informed of what is going on with your hamming. 73 de Ike, N3IK

Clem Small, KR6A
email: clemsmal@bitterroot.net

Some Antenna Tests and Measurements

Anyone who experiments with different kinds of antennas and is concerned about maximizing their performance will at times become concerned with measuring antenna resonance and feedpoint impedance.

In the past we've discussed that antenna resonance isn't always necessary for good reception, especially on the HF band and lower frequencies. On the other hand, at VHF and higher frequencies antenna resonance is important for optimizing reception. However, even on HF, when we have a low level of received noise and a weak signal, we still may profit from using resonant elements to deliver the best possible reception. If the antenna is used for transmitting, resonance can be quite important at any frequency.

Knowing the value of an antenna's feedpoint impedance can also be important, particularly if we are to select an appropriate feedline or an appropriate device for matching a feedline to the antenna. There are various ways of measuring antenna resonance and feedpoint impedance, and this month we'll talk about some of them.

❖ A Starting Point

Element length for the antennas most often constructed by hobbyists is usually determined by using one of the equations given below. There are other useful length equations, but we will limit our discussion to the most common ones:

$L_H = 468/F$ and $L_Q = 234/F$

In these equations L is the appropriate length in feet for a halfwave (L_H), or quarterwave (L_Q) wire antenna element, and F is the desired operating frequency in megahertz. Using the answers we get from these equations gives the approximate length for resonance in such antennas as halfwave dipoles and quarterwave groundplanes.

The environment around an antenna affects that antenna, and so the exact length for truly resonant elements will vary somewhat from one environment to another. The feedpoint impedance will also vary for the same reason. The length given by the above equations can be adjusted more accurately to resonance in the operating environment by using the test instruments discussed below. They can also measure the antenna's feedpoint impedance in that environment.

❖ Some Useful Antenna Test Instruments

Considering the usefulness of the equations given above, we could say that a tape measure is one necessary tool for antenna measurement! For measuring long antenna elements get a long tape measure; it is difficult to accurately measure a long antenna element using a foot ruler or yardstick measure.

❖ Noise Bridges

One useful antenna test instrument for HF or lower frequencies is the noise bridge. This device will indicate the resonant frequency and both inductive and capacitive reactance of an antenna if the measurement is done at the antenna. If a feedline is used to access the antenna the feedline should be a halfwave long at the frequency of operation if the readings are to be accurate.

In operation the bridge is connected both to your receiver and to the antenna (or feedline), and its two controls are adjusted for a null in the noise received from the bridge. The dials on the controls then indicate the resistance and reactance of the antenna or system being measured. At antenna resonance, reactance is zero. The resistance then shown is the feedpoint impedance.

Noise bridges can also be used for some measurements on transmission lines and tuned circuits.

❖ Dip Meters

Dip meters are used from LF through UHF to find the resonant frequency of inductor-capacitor circuits, and also of antennas. To begin, you should short the feedpoint break. The dip meter must then be coupled to the antenna by positioning the meter's coil at the center of the antenna wire. When the meter's most pronounced dip (the antenna's resonant frequency) is found, the coil is moved farther from the antenna to reduce coupling between the coil and antenna. This allows more accurate measurement.

It is often difficult to obtain sufficient coupling between the antenna wire and the dip-meter coil. If you make a special "coat-hanger"* coil as shown in fig. 1, it is much easier to get sufficient coupling for measurements. Try one or two turns about eight inches wide at the top for HF. It will take some cut-and-try to get the coil functioning at the frequency you want, but by monitoring the frequency of the dip meter with a general-coverage receiver you can adjust the coil until you find the size coil you need. Larger coils give lower frequencies.

When listening to the dip meter's signal don't mistake a harmonic for the fundamental frequency: the lowest signal will be the fundamental (which you want). You may find that a single loop of wire will work; for lower frequencies more loops may be necessary.

Dip meter dials are calibrated in frequency, but the frequency changes with changes in coupling. More accurate measurement of dip meter frequency is had by tuning in the signal from the dip meter on a receiver with an accurate frequency readout.

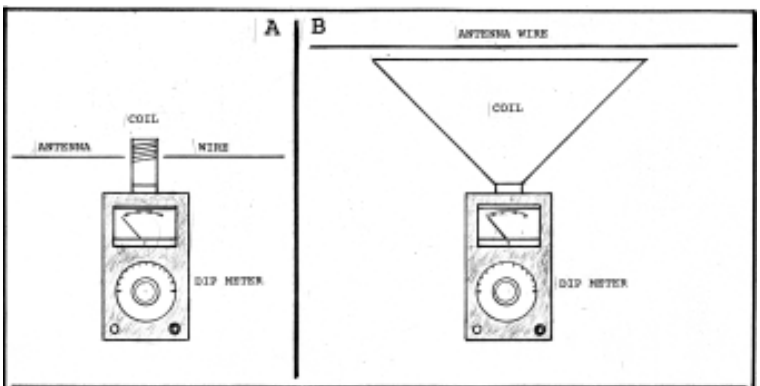


Fig. 1. A dip meter with typical coil construction (A), and a dipmeter with "coat-hanger" coil construction for better coupling (B).

❖ SWR Measuring Devices

Antenna resonance can be checked at any frequency with a

This Month's Interesting Antenna-Related Web site: **www.cebik.com/antsite.html**

This site is very well done, and full of information for both the beginner and more advanced experimenter.

standing wave ratio (SWR) meter by feeding a signal from a transmitter to the antenna via the SWR meter. Then find the most pronounced dip in SWR in the vicinity of the frequency used for the equations above. If the antenna is inaccessible, then a length of low-loss feedline which is 1/2 wavelength at the operating frequency will allow measurement of both SWR values and resonance which are sufficiently accurate for most purposes.

❖ Automated SWR Measurement

Some modern, automated SWR measuring devices are not only simple to operate, but very useful in antenna work. Depending on the model used, they perform from MF through UHF. These include the MFJ SWR Analyzers™, the Autek Antenna Analysts™, and the AEA HF and VHF Analyzers™. With instruments such as these, antennas can be quickly checked for SWR across wide bands of frequencies, and their resonance determined. Some instruments can obtain information about other antenna or transmission line variables such as antenna resistance, reactance, etc..

RADIO RIDDLES

Last Month:

I said: "Ohmic resistance is mentioned above. Isn't all resistance 'ohmic'? What other kind of resistance could an antenna possibly have anyhow?"

Well, all resistance is measured in ohms, but some variables measured in ohms are not resistance. So we use the term "ohmic resistance" if we want to specifically indicate resistance which is the opposition to direct current (DC) flow.

For instance, nonresonant antennas offer reactance at the antenna feedpoint. Reactance is measured in ohms although it is not ohmic resistance. For one more example of non-ohmic ohms, consider that when an antenna radiates a radio signal the energy so radiated represents a loss of electrical power to the antenna circuit. Similarly, the heat lost from a resistor represents a loss of electrical power to a DC circuit when a DC current heats that resistor.

By measuring the RF current flowing in an antenna we could calculate the resistance to that current which would be necessary to convert to heat the same amount of power which is lost as signal radiation. We call this calculated "resistance" the "radiation resistance." Radiation resistance is measured in ohms, but it is obviously not ohmic resistance.

This Month:

What widely-known information do you suppose leads to the derivation of the antenna-length equations given above?

You'll find an answer for this month's riddle, another interesting, antenna-related web site, and much more, in next month's issue of *Monitoring Times*. Till then Peace, DX, and 73.

*after Moxon, L.A., 1982, *HF Antennas for All Occasions*, London, Radio Society of Great Britain, 1982, pp 231.

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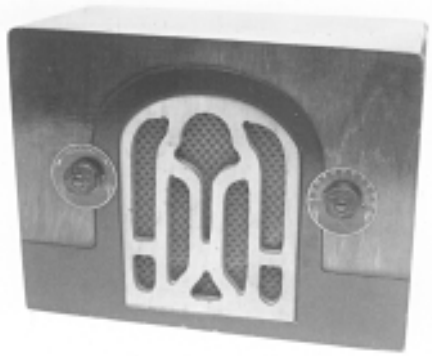
Depression Downsizing

In the last column, we took a look at two parallel developments in radio receiver design: (1) the introduction of screen grid tubes that gave the TRF circuit a new lease on life and (2) the application of more sophisticated manufacturing techniques that allowed receiver layout to be planned in a more integrated manner. Power supplies moved onto the main chassis, tuning capacitors were ganged, with related parts grouped around them for shortest leads, loudspeakers moved inside the cabinet. This is a trend that began in the late 1920s and continued into the early to mid 1930s. It was the era of the large "tombstone" and "cathedral" table models and the massive living room consoles.



The wood cabinets typical of early depression radios had a certain ingenuous charm. This is a no-name set, but very similar in construction to the International Kadette (see text).

❖ Enter the Pentode

In this installment, we'll take a look at the combined effects on radio design of two additional developments: the introduction of pentode (five-element) tubes and the deepening of the world-wide "Great Depression." The pentode was born in the research laboratories of the Holland-based Phillips Company. It was invented as a way of getting around an annoying problem exhibited by the tetrode (screen-grid) tubes.

The problem stemmed from the fact that the positively-charged screen grid added to the attraction of the positively-charged plate on the stream of electrons emerging from the filament or cathode – accelerating them to very high speeds. The speeding electrons knocked loose additional electrons as they impacted on the plate – a phenomenon called "secondary emission." Many of these electrons were attracted to the screen grid, limiting amplification and introducing nonlinearity into the tube's voltage vs. plate current curve.

The solution was the introduction of an additional grid, known as the *suppressor grid*, between the screen grid and the plate. It was connected (usually internally) to the cathode or filament. Because the suppressor grid was at the same potential as the cathode or filament, it neither hindered nor accelerated the stream of electrons emitted by these elements. However, being negative with respect to the plate, the suppressor grid tended to repel the electrons knocked loose from the plate, sending them back towards that element. There they were re-attracted to become part of the plate current, improving linearity, efficiency and power-handling capability.

Pentode tubes suitable for both r.f. and audio amplification were released in the early 1930s. The dramatic increase in amplification and efficiency they provided was made possible with virtually no increase in a set manufacturer's parts count. And though presumably pentode tubes had higher first cost than tetrodes, radio sales were skyrocketing as cash-starved families took radios into their homes as a means of inexpensive entertainment. I don't have numbers to give you, but it's obvious that the economies of mass production must have driven the cost of tubes and other radio components ever downward.

❖ The International Kadette – A Minimal Set

Add to the enhanced tube performance the fact that radio stations were becoming more numerous and more powerful, throw in the financial hardship faced by many families, and you'll see that the time was ripe for the introduction of a truly minimal radio design. This was realized in the form of the International Kadette Universal TRF receiver (Fig. 1).

Excluding the power supply rectifier (far right), the set had exactly three tubes: a type 39 (pentode) r.f. amplifier, followed by a type 36 (tetrode) r.f. amplifier and a type 38 (pentode) detector-audio power amplifier. Compare this to the typical "three-dialer" battery set with five triode tubes: two r.f. amplifiers, a detector, and two audio amplifiers. The Atwater Kent Model 42 we used earlier as an example of one of the first a.c.-operated sets had *six* triodes, the extra one being an additional stage of r.f. amplification.

I don't have a picture of an International Kadette to show you, but take a look (Fig. 2) at a detail from an ad for the Emerson "Universal Compact Radio." This receiver has the same tube lineup, and is virtually the same electronically, as the Kadette set. Notice it nestling comfortably on an outstretched hand. The ad gives the dimensions as 10 inches wide, a little over 6 inches high and 4-1/2 inches deep. Selling price was advertised at $25.00 – maybe a lot of depression dollars, but significantly less than the expense of one of the large tombstones or cathedrals discussed in the last column. And I have no doubt that the price was discounted by many sellers.

Fig. 2. Detail from ad for Emerson's "Universal Compact" set. The copy stressed small size, low price, a.c.-d.c. operation.

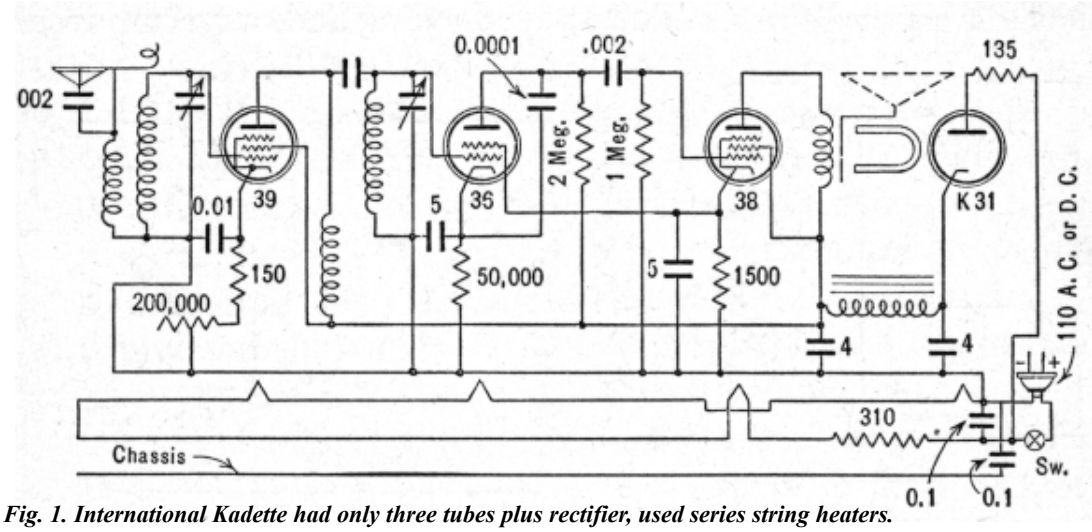


Fig. 1. International Kadette had only three tubes plus rectifier, used series string heaters.

❖ Series String Heaters

Take another look at the schematic of Fig. 1 and you'll spot another reason for the diminutive size and price of the Kadette or Emerson Universal. There is no power transformer. Receivers have power transformers to perform two functions: (1) step up the line voltage from 115 to the perhaps two or three hundred volts required to energize the plates and screens of the tubes and (2) step down the line voltage to the low voltage (typically 2.5, 5 and/or 1.5) required to light the tube filaments.

Because of the factors of higher tube efficiency and more powerful and numerous broadcast stations already mentioned, the tube plates and screens could be operated with reasonably good results from the lower voltages derived directly from the 115-volt power line. Lighting the tubes was a different problem.

Think of a Christmas-tree light set – the series-connected kind where all the lamps go dark when one burns out. The ones from the 1940s typically had a dozen lamps with 10-volt filaments. They were in series, so (as long as each lamp had the same current drain) the 120-volts or so from the line divided equally among the lamps, providing each with the necessary ten volts.

The Kadette and Emerson radios used tubes that had been developed primarily for auto radio use, and thus were designed to light from the 6-volt (or 6.3-volt when "floating" fully charged on the generator) car battery of the time. Take another look at Fig.1 and you'll see the tube heaters (not shown in the tube envelopes, but indicated separately at the bottom of the schematic) are connected in series, and included in the series string is a 310-ohm resistor. The rectifier tube, indicated as a "K31," is probably identical to, or very similar to, the early half-wave rectifier normally designated "1V." Like those of the other three tubes, its heater requires 6.3 volts at 0.3 amperes.

Adding up the 6.3-volt heaters of the four tubes, we get 25.2 volts. Using a little Ohm's law, we find that, at the .3 ampere heater current running through the string, the 310-ohm resistor drops .3 X 310 = 93 volts. Adding this to 25.2, we come up with a total voltage drop of 118.2 – which is a good match for the normal line voltage.

Before closing for this month, I need to address just one more issue. Take a look at the Emerson ad of Fig. 2, and you'll see that the set is touted as operating from either a.c. or d.c. current. What's that all about? Simply this: a transformer is an a.c.-only device. By eliminating it, we have created a radio that will operate from either a.c. or d.c. Perhaps not much of a selling point, but back in the 1930s, the downtown areas of many cities were supplied with 115-volts d.c. rather than a.c. – a carryover from the old Edison Illuminating Co. light plants.

Actually, as recently as 10 years ago, a few areas of downtown Chicago had d.c. power. And I remember that, during my teen years, my father's business office and my uncle's medical office (both Boston area) had d.c. power. My uncle kept an impressive dynamotor type power inverter in a supply closet to operate some of his medical equipment. Also a reader (name unknown) recently wrote me that many early farm battery light plants delivered d.c. at the standard 110-115 volts. So an a.c.-d.c. set certainly *could* be handy at times!

See you next time, and remember that I'm always interested in hearing from you! E-mail address at top of this column; snail mail me at P.O. Box 1306, Evanston, IL 60204-1306.

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More DSP Filter Programs

Last time we looked at software programs that could be used to clean up the whistles and beeps that have afflicted radio monitors since the days of Marconi. Using the power of a PC these digital signal processing programs (DSP) can be easily configured to emulate low pass, high pass and notch audio filters. These provide the user with not just one, but many simultaneous filter types. Not only that, but each is "tunable" with just the use of a mouse. Just image how much hardware, soldering and cost this capability would have commanded just a few years ago!

Well, since last time I have discovered a number of other DSP filter programs. This month's column should complete the list of DSP filter programs currently available from which to choose demos or full programs.

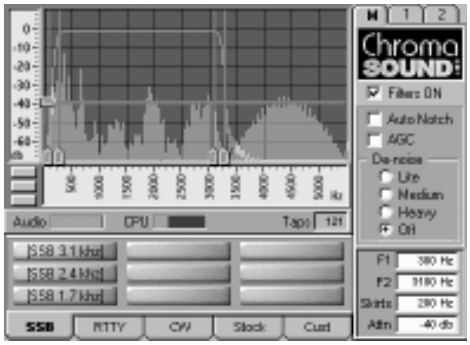

Figure 1 – Chromasound's compact business screen

❖ Recap

First, let's go back over the basics of DSP.

An audio DSP chip, or program, connects between a receiver and a speaker. First, the DSP hardware/software converts the audio into digital data. Once in the digital domain, the DSP simulates high quality audio filters via software routines. The "filtered" digital signal is then reconverted back to audio – *sans* whistle or noise.

We started this DSP odyssey looking at the GNASP1 and Swezey DSP programs (see last month's *Computers & Radio*). Since then Swezey has released a new version, 3.3, which I encourage you to evaluate.

Since our DSP search began we have found more DSP programs on the Web. **Chromasound**, and **SR5** are DSP programs with filtering capabilities. We will take a look at a group of related DSP programs, which provide visual analysis of an audio spectrum. Just a few years ago it would have taken tens of thousands of dollars to have such a capability. Now it is just a download away with programs such as **Analyzer 2000**, **Spectrogram** and **Spectran**.

Most of these programs require Windows 95, 32 MEG of RAM, a duplex capable sound card and a Pentium 166 MHz. I used a Fujitsu Lifebook 7350 to put these programs through their paces.

❖ Chromasound

This DSP audio filter program provides one of the slickest presentations and user interfaces. See Figure One. Everything you need is accessed from this main screen. Filter parameters, such as start/stop of notch filters, are changed by dragging vertical bars on the display. Corralling the offending whistle, which appears as a constant peak on the graph, with the vertical bars, makes monitoring pleasurable and easy on the ears. In fact, select the "Auto Notch" feature on the right of the displays, and the program does the corralling for you! Very nice.

You'll notice that Chromasound has been designed specifically for monitoring applications. Although the user can customize just about any audio filter to their liking, Chromasound is preprogrammed with multiple single side band (SSB), Morse code (CW) and radio teletype (RTTY) filters. These are accessed via the tabs at the bottom of the display.

Chromasound has many more convenient features, such as preprogrammed high pass, low pass, band pass and band reject filters. Don't be fooled by the simplicity of the display. Much thought and consideration has gone into this product resulting in simple, yet very effective, operational capabilities. Chromasound's computer requirements are: Pentium 90 MHz minimum, 200 MHz or above for best results, 16MB RAM with 32MB recommended, 16-bit card with full-duplex drivers and Windows 95/98 or above.

Chromasound is priced at $50, via email registration of downloaded trial version from Silicon Pixels at **www.siliconpixels.com**.

❖ SR5 Spectrum Analyzer V2.0

This product, from AR5, has one foot in each of the program type camps: Filter and Analysis. Its screen has three display regions and a command bar. See Figure Two. The middle region, where three peaks are displayed, displays the input audio signal. Directly below is the command area. From here we have chosen the notch filter and the result can be see in the upper display region.

SR5's notch filter routine tracks frequencies which constantly have a component amplitude (i.e., whistle). It then notches out that frequency, or in this case, three frequencies. The threshold level where the filter takes over is set via the horizontal line seen in the input signal region.

In addition, SR5 has user-definable, real-time linear filters. Filter coefficients, which define the operation of the filter, have been preloaded to provide a CW filter of 200 Hz width at the - 3dB points, and centered on 900 Hz when sampling at 6400 Hz. The bandwidth is 300 Hz when sampling at 8192 and 11025 Hz.

With a little bit of reading (check SR5's Help file) and experimentation, a user can customize this filter to their monitoring needs. After seeing all the features of SR5 (we have not covered them all) it is clear that it was written with the radio user in mind. SR5 version 2.00 is available from their website **www.ar5.com** for a cost of $25.

❖ Analyzer 2000

Some programs are very useful to radio monitoring by providing visual presentations

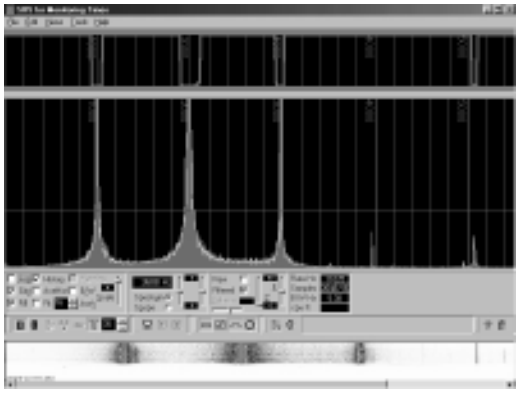
Figure 2 - SR5 auto-notching three tones

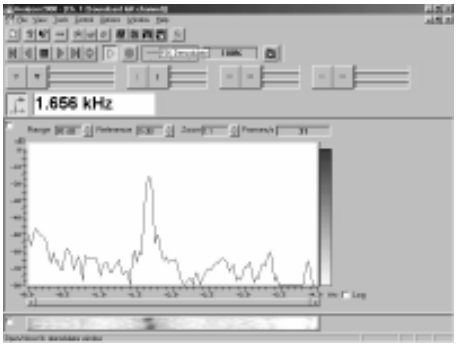

Figure 3 - Analyzer 2000 showing off

of audio signals. These programs act just like expensive digital oscilloscopes, while providing many new features. Analyzer 2000 Version 4.0 by Brown Bear is one such program.

In Figure Three the center of the screen displays the input signal. Here we can see a real whistle, which the large digital display at the left center indicates, is centered at 1.656 kHz. The user can select these digits to display peak frequency, signal-to-noise ratio or, for you audiophiles, percent harmonic distortion. The window at the bottom of the screen gives spectral representation of the input signal with respect to time. You can see the black line directly under the input peak. Options for static and dynamic frequency markers abound, as do many other options.

Analyzer 2000 has built-in decoders for RTTY and Morse. In Figure Three the location of the decoders is highlighted by the cursor and "FSK Demodulator" flag. So clearly, this program has also been written with direct application to radio monitoring. Analyzer 2000 is $98 for the full version. Give their 30-day trial version a try at **www.brownbear.de**.

❖ Spectrogram

As the name implies, Spectrogram version 5.0.8 is another audio spectrum program. Although its operation takes some getting used to, it has many useful features, a simple display and it is free. Their site is **www.monumental.com/rshone/gram.html**.

❖ Spectran

Spectran, beta version 2c, also provides a very nice graphical presentation of the audio spectrum. It is simple to use, a nice layout and has many useful features. However, as the "beta" tag implies, some buttons do not work. The one that I was interested in, B Pass, which invokes a band pass filter, is only a button right now. However, even in its current stage of development it is very useful. Keep an eye on their website, **http://sr10.xoom.com/spectran/** for future developments.

If you want to learn about Fast Fourier Transforms, the stuff DSP is made of, check out FFT Properties version 3.5 at **www.regsoft.com**. This program promises the full menu of DSP capabilities plus a programmable signal generator.

Other DSP programs, which run only in the DOS mode are **Hamview**, and **DQA**. If you are a DOS fan you can find them at their respective websites: For Hamview - **www.freeyellow.com/members/padan** and **www.daqarta.com** for DQA.

And don't forget the two we started with last time: GNASP1 at **http://members.tripod.com/~gniephaus/gnasp1/gnasp1.html** and the Swezey website at **http://www.winternet.com/~swezeyt/dsp.htm**

❖ DSP-ed to Death

I think that should just about cover everything you wanted to know about availability of DSP audio filter and spectrum programs! Due to space and time constraints we have left out lots of neat features of these programs. I encourage you to try each one out to find the one that's right for your monitoring habits. Next time we'll leave DSP, but dig further into a topic that ten years ago did not exist – computers & radios.

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What's New with CB?

In case you thought that all the radio fun without a license was focused solely on Family Radio Service or General Mobile Radio Service, let me remind you that the Citizens Band radio is still very much alive and well.

Citizens Band in the United States is allocated to 40 channels:

1 26.965	21 27.215	11 27.085	31 27.315
2 26.975	22 27.225	12 27.105	32 27.325
3 26.985	23 27.255	13 27.115	33 27.335
4 27.005	24 27.235	14 27.125	34 27.345
5 27.015	25 27.245	15 27.135	35 27.355
6 27.025	26 27.265	16 27.155	36 27.365
7 27.035	27 27.275	17 27.165	37 27.375
8 27.055	28 27.285	18 27.175	38 27.385
9 *27.065	29 27.295	19 27.185	39 27.395
10 27.075	30 27.305	20 27.205	40 27.405

CBers can operate without a license in either AM or single sideband mode on any of the 40 channels, and lots of people still use CB.

As if to affirm the health of the CB marketplace, two manufacturers have recently unveiled new radios.

The New Cherokees

Cherokee's brand new **CBS-2100** base station is a real eye popper: 19 inches wide by 6 inches high by 14 inches deep. It offers a full four-watt power output in AM mode and 12 watt power output in single sideband mode, and it is not designed to be readily modifiable for operation outside the legal CB frequencies. Designed so that it can be rack mounted, it has a brushed silver front panel, and all the features a CBer might want: AM and SSB modes, a true frequency counter, and the right knobs and switches to put this impressive rig through its paces.

A compander circuit called Clear Drive compresses audio on transmit and expands it on receive. When both stations at either end of a conversation are using ClearDrive it can really boost the signal for long-haul communications, but the technology can also help in single station use as well.

The performance of the CBS-2100 on both transmit and receive is outstanding. I give it my highest personal recommendation. The suggested retail price is $499.95.

Also from Cherokee come two new Nightrider mobile radios. They have a backlit front panel that glows like one of those Indiglo watches. When the display is turned off, it looks like white plastic. When the power is on, the front panel glows with a soft blue light that backlights the lettering for each of the controls.

The **Cherokee Nightrider 100** is a 40-channel AM-only mobile rig. Measuring 2-3/8 inches high by 7-3/16 inches wide by 9-1/8 inches deep, this rig has a bottom-firing speaker and connectors for antenna, public address speaker, external speaker, and power cord on the back panel. To boost performance under noisy conditions, it is equipped with Cherokee's Clear Drive system.

The **Nightrider 150** measures 2-3/8 inches high by 7-7/8 inches wide and 9-1/4 inches deep and offers all the features of the Nightrider 100, *plus* sideband mode, which can nearly double the communication range between CBs (when both are using sideband). While the Nightrider 150 has the same back panel layout and bottom-firing speaker as the 100, the front panel setup is actually simpler.

Both Nightrider mobiles deliver excellent performance. Suggested retail price of the Nightrider 100 is $199.95, and SRP for the Nightrider 150 is $239.95. For more information about any of the Cherokee radios, contact Wireless Marketing Corporation at 1-800-259-0959 or visit **www.wirelessmarketing.com**.

Cobra Strikes Again

Cobra, a venerable name in CB, has also joined the "radios that glow in the dark" club with the **Cobra NightWatch 29** WX NW ST. It features seven weather channels, NightWatch technology (more about that in a moment) and Cobra's SoundTracker system.

This 40-channel, AM-only rig measures 8-5/8 inches deep by 7-9/32 inches wide by 2-13/16 inches high. The NightWatch fully illuminated display consists of an electroluminescent panel that glows under an overlay. Switch it on and the lettering for each of the controls glows. Crank up the dimmer switch and the lettering gets brighter while the entire faceplate of the radio is glows faintly.

This radio not only receives NOAA weather channels but also weather alert tones. It will receive the alert tones even if the rig is turned off or if the rig is in CB mode, so long as there is power to the rig. This means that you can be driving down the road using the radio in CB mode, and if the weather service issues an alert of threatening weather you will hear it.

The performance of this radio is classic Cobra 29 – excellent audio on both receive and transmit. In addition, the SoundTracker system, when activated, can provide a noticeable reduction in noise on receive and, in certain situations, can help to boost transmitted audio. Suggested retail price of this new CB is $149.95. For additional information visit **www.cobraelec.com** or call 1- 773-889-3087.

"The Palstar R30 is a lot of radio for under $500. This radio plays."

- Wayne Mischler, MT, June, 2000

The New

Palstar R30

NOW AVAILABLE!

High performance and low price, an unbeatable combination! And the new Palstar R30 claims both! With a frequency coverage of 100 kHz through 30 MHz, multimode AM/USB/LSB reception, and 20 Hz fine tuning steps with variable rate tuning, the R30 is a double up-conversion superheterodyne (45 MHz/455 kHz) with 6 kHz and 2.5 kHz selectivity, six-digit LCD frequency display, a true analog S-meter, and 100 memory channels.

And Palstar doesn't mind publishing their excellent low-intermod specification: +15 dBm third-order intercept point for strong-signal-overload immunity, with 90 dB second-IF image rejection! And if you do need to reduce overload, simply press the 10 dB attenuator. AGC speed is also selectable, slow or fast for AM and SSB.

High sensitivity (0.5 uV) nabs those weak signals, and interference is reduced by switchable 7-pole input filters. Reviewers give the R30 "thumbs up" for adjacent channel interference rejection, but for even sharper selectivity, order the R30C with a 455 kHz Collins mechanical (torsional) filter!

The 5 watt audio amplifier sends low distortion sound to the high-quality internal speaker, with plenty of reserve power for an external speaker! And there's a line output for recording.

Its compact size (8"W x 2.5"H x 9"D) belies its big performance, and it may be powered by 120 VAC, 12 VDC, or 10 internal AA cells (not included) for portable/emergency operation.

ORDER TODAY!

RCV18	**$495.95** *plus $11.95 UPS*
FTR06 Collins filter	**$103.95**

GROVE

Grove Enterprises, Inc.

800-438-8155

7540 Highway 64 West
Brasstown, NC 28902
828-837-9200 828-837-2216 (fax)
order@grove-ent.com
WWW.GROVE-ENT.COM

Review by Wayne Mishler, KG5BI

Palstar R30 - back to the future!

Palstar presents its new R30 receiver as the "ultimate in listening." That's a tall order in today's competitive world of radio technology. But the R30 backs the claim with demonstrated performance. From the first click of the power knob, you sense that you are at the controls of a quality receiver. This radio has the heft, the quality sound, the sleek profile, the aesthetic styling, the feel of durability that we have come to expect from true DX machines.

You can see the entire line of Palstar radio products at **www.palstarinc.com**.

The solid-state R30 is a no-nonsense "made in USA" shortwave receiver with the sensitivity and dynamic range needed to hear fly-speck stations in a jungle of powerhouse signals and cosmic noise.

Today, bells and whistles are expected and convenience is king. When you meet the R30, prepare for some surprises and a sentimental journey back to the future. Don't rush to judgment. And don't expect keypad entry. This radio tunes stations the old-fashioned way – by turning a knob.

Manual tuning in a new-millennium receiver? Yep. And with no apologies. Nostalgia aside, the R30 tunes with the solid feel of rigs of yesteryear combined with the stability of tomorrow's digital wonders. That's a mix you have to experience to appreciate.

Tuning the bands

The R30 features continuous frequency coverage from 100 kHz to 30 MHz.

Tuning is simplified by three dialing speeds and a user-friendly memory system. There are two buttons next to the tuning dial that change frequency up or down in one MHz jumps. This skips across the shortwave spectrum in a hurry. You soon start thinking in MHz. "Let's see what's happening on 5, 9, or 15 MHz."

Pushing on the tuning dial until it clicks toggles between two additional tuning speeds that help you maneuver between MHz. The faster of the two speeds changes frequency in 500 kHz steps. The slower setting varies from 20-200 Hz steps, depending on how fast you spin the dial.

User-friendly memory

The 20-page operations manual is well written, clearly illustrated, comprehensive, and easy to understand. After reading the manual and practicing with the controls, you'll soon be navigating the bands with ease. And your navigating skills will improve when you get the feel of the R30's user-friendly memory system.

The process of storing frequencies is almost intuitive. Press the memory button for about 2 seconds and a channel number appears in the display window. There are 100 memory channels. You can either accept the default channel or select another one by turning the dial. With your channel selected, press the memory button again and the displayed frequency is stored in the displayed channel, with all associated information. This takes less time to do than to read.

If a selected channel is occupied, a "P" will appear with the channel number in the display window. Storing a new frequency in the channel will overwrite the previous entry.

To recall a frequency, press the memory button. The frequency readout disappears from the display window. A memory channel number appears. You then dial to the desired memory number with the tuning knob.

Press the memory button again and you return to normal (VFO) operation. The channel number disappears. Frequency reappears. But you remain at the memorized frequency. In this way, pushing the memory button is sort of like catching a cab that drops you off at Hollywood and Vine.

A caveat: The memory and mode buttons are located next to each other – a finger width apart – and they look alike. After tuning a frequency, and then deciding to change from AM to SSB mode, you can accidentally hit the memory button which switches you from your tuned frequency to a memory channel. To get back where you were, you have to redial your frequency, which may be many MHz away, and no cab to take you home.

On the upside, you can use the taxi technique to greatly speed the tuning process. For example, store 5900 kHz AM in channel 49 (for the 49 meter band); 7100 kHz AM in channel 41 (for the 41 meter band); 9400 kHz AM in channel 31 (for the 31 meter band), and so on. Then, when you want to tune in the 41 meter band, press the memory button, dial to channel 41, press the memory button again, and there you are, at 7100 kHz, within easy dialing distance of all AM stations in that band, with a minimum of tuning effort.

The same technique could be used to quickly take you to your favorite utility frequency ranges.

The memory system is great as is. But possibly some sort of compromise – either an escape route back to the VFO frequency or relocation of the memory button to avoid accidents – might be an opportunity for improvement in future versions.

Paul Hrivnak, owner of Palstar, Inc., says that change may be considered if it becomes an issue. "It would require a software change (that we would weigh carefully) against commitments we've made to our European distributors," he explains.

An overall good performer

The slight inconveniences of manual tuning does not deter from the quality feel and the overall good performance of this fine radio.

Portability is one of the R30's really strong points. It is small enough to fit in a briefcase, and with an amplified antenna would be a great travel companion. It runs on 12 volts DC and comes with an AC adapter. You can also power it with ten AA batteries. The receiver draws between 350-600 milliamps. The internal battery

pack is automatically disconnected from the circuit when you plug in an external 12-volt DC power source.

To load or change batteries, remove four screws and lift off the top cover. The internal battery holder sits on top of the chassis. A metal strap holds the batteries in place. Remove another screw, lift the strap, insert fresh batteries, replace the strap and top cover, and you are ready for operation on the go. No amount of buffeting will dislodge those batteries. And there is no plastic battery compartment cover to lose. Bravo!

❖ A joy to operate

A very sturdy bail lifts the front of the receiver for convenient desktop operation. The bail retracts to the bottom cover when not in use, and the radio sits on four feet. The two back feet are made of soft rubber, which prevents sliding.

In operation, the analog S-meter and six-digit liquid crystal frequency display are backlit with an appealing soft yellow glow. Frequency digits are black and large enough (about 5/8-inch high) to be seen from across the room. The S-meter reads from S1 through S9, with additional markers at +20, +40, and +60 db over S9.

The main operating controls are five buttons positioned in a row under the frequency display. They allow selection of memory or normal operation, mode, attenuation, bandwidth, and AGC. The mode button switches between AM, USB, and LSB. The attenuation button reduces the incoming signal by 10 dB. The filter button toggles between two bandwidths (2.4 and 6 kHz) that are available in all modes. The AGC button chooses fast or slow response times.

A line audio jack on the back panel enables you to connect a tape recorder.

There is no clock, timer, notch filter, or AM synchronous detection, but the receiver performed so well on the air that fading was not a problem, even in times of moderate propagation.

The two ceramic IF filters do a good job of quieting interfering stations on the edges of the pass band, dropping out heterodynes very effectively, even without a notch filter. You can use either filter in AM and SSB modes. A third option for a slightly tighter AM filter would be nice, but of course would affect price. For an extra hundred bucks, you can get the R30C, with Collins mechanical filters in the IF, if that is your preference.

The 2.4 kHz single-side band ceramic filter works well in reducing interference while operating in AM mode. With the push of the mode button and slight readjustment of the tuning knob, you can listen to either of the station's sidebands and possibly avoid an interfering signal on the edge of the AM passband. This greatly increases IF flexibility, and adds to the power of the R30 in AM DXing.

❖ Test results

Palstar claims 2 microvolts sensitivity on AM from 100 kHz to 2 MHz. *MT*'s tests (performed by Ben Hester) indicated 0.51 microvolts (at 1.5 MHz), 0.54 at 13.5 MHz, and 0.78 at 28.5 MHz, for an average of 0.61 microvolts at 10dB signal plus noise to noise ratio on AM.

We measured 0.49 microvolts at 9.5 MHz on SSB. Palstar claims 0.5.

In other *MT* tests, image rejection measured greater than 65dB at 45 MHz, and greater than 90 dB at 455 kHz. Dynamic range tested greater than 90dB at 50 kHz spacing. Third order intercept tested at +15 dBm.

Inside, the R30 is immaculate with nicely finished circuit board and professional soldering which are marks of quality.

❖ But does it play?

Okay, so the R30's got a pretty face, clean innards, and some muscle. But does it play?

Let's talk about that. The R30's internal speaker, mounted in the top cover, provides rich sound for its size. The audio really sounds good though a high-quality external speaker or good set of headphones. The headphone jack is located on the lower left corner of the front panel – right where it should be.

The stronger AM shortwave broadcasts sound like local radio stations when using a good external speaker. Weaker stations emerge from the noise very effectively, especially when using the DXer's sideband and narrow filter trick.

This radio promises to be a real contender in the demanding world of utility listening. Its excellent sensitivity, superb dynamic range, and good IF filtering let you hear the really weak signals from ships, aircraft, and battlefields, when used with a good antenna. And those 100 memories are great for storing hot frequencies and for getting to the hotspots in a hurry.

Switching to sideband mode automatically engages a beat frequently oscillator for CW monitoring. The R30 hears code just as well as it does sideband. A 500 Hz IF filter, which the R30 does not have, would be nice for heavy duty CW utility work, but is not necessary for hearing a weak SOS from halfway around the world.

❖ Bring on the transmitter!

The R30 would be a great sidekick on a ham radio field expedition. It even has a mute jack on the back panel for use with a transmitter. Could there be a companion transmitter to the R30 in the future?

Palstar is not saying...exactly.

"I do have something that might be of great interest," says Hrivnak, "but will discuss it only when I have produced some units and am ready for an official introduction."

With or without a transmitter, the Palstar R30 is a lot of radio for under $500. This radio plays.

Bob Parnass, AJ9S
parnass@megsinet.net
www.megsinet.com/parnass

Radio Shack PRO-2052 Trunk Tracker Scanner

The Radio Shack PRO-2052 is a 1000 channel table top scanner capable of selectively following conversations in VHF and UHF Motorola and Ericsson trunked radio systems. The PRO-2052's front panel looks identical to the earlier PRO-2050 we reviewed in May 1998. Uniden manufactures both models in the Philippines for Radio Shack.

Physical resemblance aside, the PRO-2052 has several improvements over the PRO-2050. The new model tunes the 225 - 400 MHz UHF military air band, VHF television channels 7 - 13, the 216 - 225 MHz band, and a 1240 - 1300 MHz sliver. The designers censored frequencies adjacent to the cellular phone bands so our PRO-2052 will not receive 823.9625 MHz – a frequency commonly allocated to local and state government agencies.

Memory capacity is increased from 300 channels in 10 banks to 1000 channels in 20 banks. A new 9 pin jack permits the PRO-2052 to be connected to a personal computer, though software is not included. The user manual documents the computer commands so programmers can write software to "drive" and download the PRO-2052.

The PRO-2050 tracks only 800 MHz Motorola trunked systems. The new PRO-2052 has expanded trunking to Ericsson systems and can track conversations in the 137 - 174, 406 - 512, 800, and 900 MHz bands.

The PRO-2052 is compatible with NOAA's SAME system (Specific Area Message Encoding) and you can program the PRO-2052 with FIPS codes for up to 15 areas.

Conventional Features

A 2 second rescan delay may be programmed on a per channel basis. A query feature identifies duplicate memory channels. Our PRO-2052 scans a mixture of frequencies at 73 channels/sec., skipping over empty channels.

One channel per bank can be designated a priority channel and sampled every 2 seconds. A single pair of frequency limits can be programmed for searching up or down, but searching and priority cannot be used simultaneously. Up to 50 frequencies may be locked out from a limit search.

There is no Direct key or direct search facility. Factory preprogrammed frequencies for police, fire/emergency, commercial air, public service, and weather can be scanned by pressing the SVC key. You can lock out up to 20 frequencies from a service bank search.

Frequency step sizes and AM, WFM, and NFM emission modes are selected automatically depending on the frequency and cannot be overridden. There is a 6 MHz step size when searching the VHF television bands and you cannot program the PRO-2052 for frequencies in between the TV audio channels.

Figure 1: Radio Shack PRO-2052 scanner

Trunk Tracking

Each of the PRO-2052's 20 banks can be programmed with the frequencies for a single trunked system or with frequencies for conventional use. You must identify the type of trunked system before programming a bank using a needlessly complicated procedure. For instance, you must differentiate between Motorola VHF, UHF, 800 or 900 MHz systems. The PRO-2052 firmware should know this by the frequencies you program in memory, but it does not.

You can scan several banks of trunked systems but the PRO-2052 cannot follow trunked conversations and scan conventional systems at the same time. We scanned three trunked systems and observed a 5 second delay before our PRO-2052 switched to the next bank, even during silent periods.

You can search or scan for active talk groups in the trunked domain and lock out up to 100 uninteresting talk groups. You can program up to 5 lists per bank with talk group numbers for scanning. Each list can hold up to 10 group IDs.

Usability and Performance

The PRO-2052 keyboard, display, and cabinetry resemble the PRO-2050 closely. The LCD display is easy to read and brilliantly backlit by an incandescent bulb through an orange filter.

The volume and squelch knobs are too close together and it's difficult to adjust one knob without a finger bumping into the other knob. The tiny dimple marker on each knob is virtually invisible.

The rubber keypad has a good feel and a keypress confirmation beep can be disabled. We must squint to read the tiny keytop lettering of the center keys. The Manual key is perhaps the most important key in any scanner, but it is small and the same color and shape as most other keys. Radio Shack had two years to make the keypad and knobs easier to use but they did not.

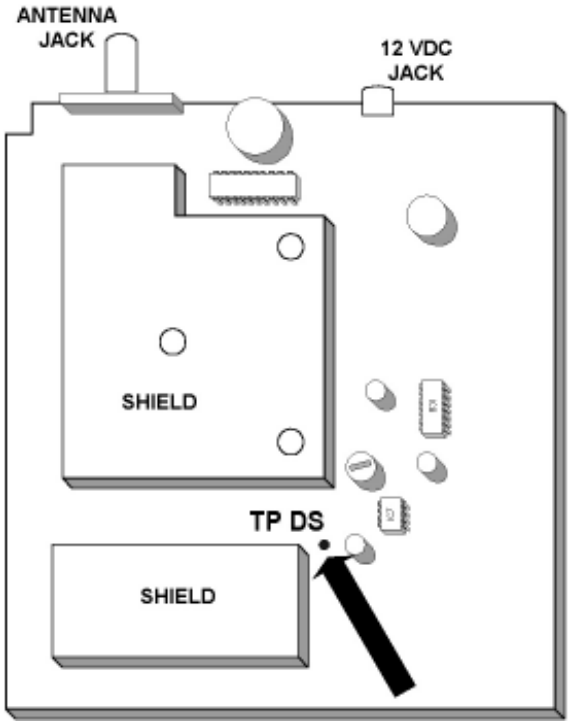
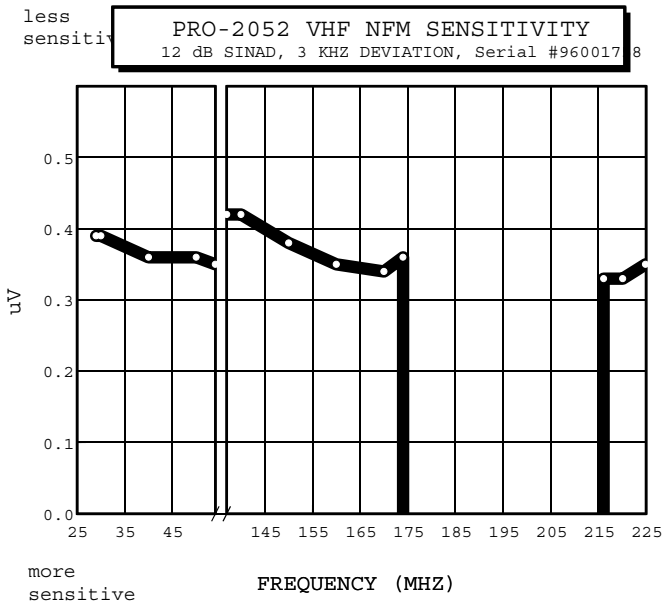
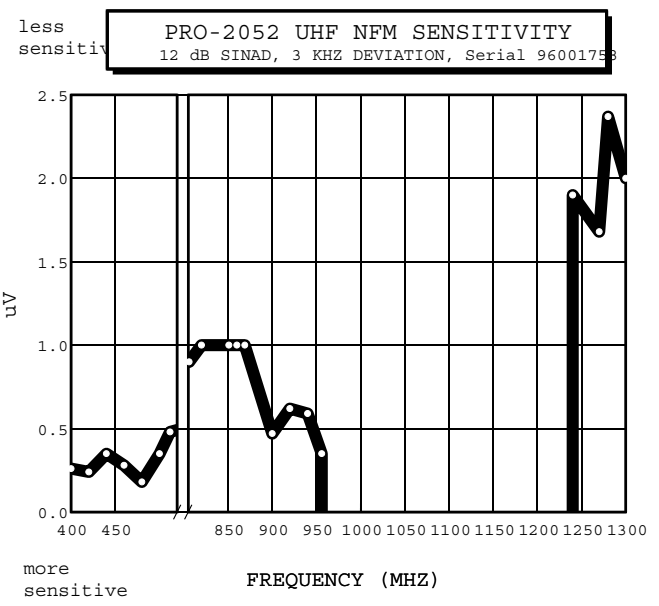
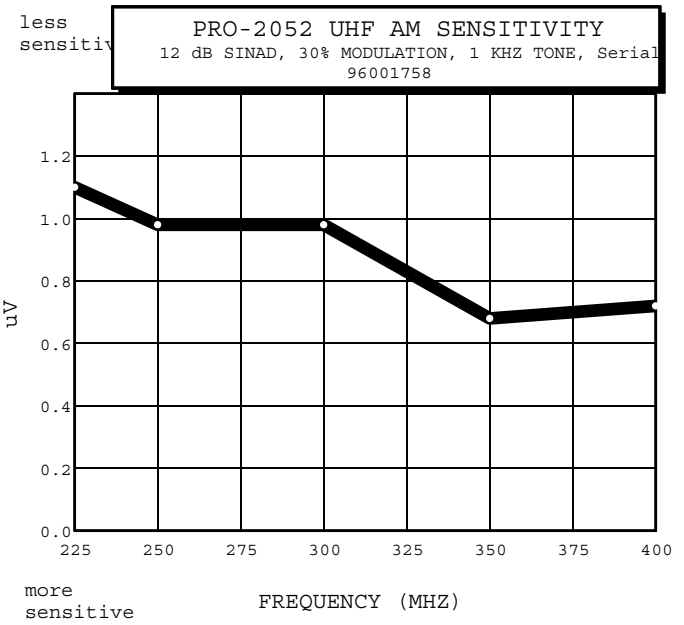


Fig 2: Discriminator tap is labeled "TP DS" (most components omitted for clarity)







Measurements

Radio Shack PRO-2052 Scanner
S/N 96007658

List price $369.99
Tandy Corp.
Fort Worth, TX 76102

Frequency coverage (MHz):
29 - 54 (5 kHz steps)
108 - 136.975 (AM, 12.5 kHz steps)
137 - 174 (5 kHz steps)
179.75 -215.75 (WFM, 6 MHz steps)
225 - 399.9875 (AM, 5 kHz steps)
406 - 512 (12.5 kHz steps)
806 - 823.9375, 851 - 868.9875, 896.1125 - 956 (12.5 kHz steps)
1240 - 1300 MHz (12.5 kHz steps)

FM modulation acceptance: 13 kHz

Intermediate Frequencies:
254.4 or 380.7 (approx), 10.7 or 10.85, and 0.450 MHz

Image rejection due to 1st IF:
69 dB at 155 MHz
69 dB at 224 MHz
66 dB at 460 MHz

Image rejection due to 2nd IF:
69 dB at 155 MHz
67 dB @ 224 MHz
68 dB at 460 MHz
70 dB @ 860 MHz

Audio output power, measured at headphone jack:
760 mW @ 10% distortion

Squelch tail near threshhold (1 uV @ 155 MHz): 5 ms.

Practical memory scan speed: 73 channels/sec.
Search speed, Turbo: 286 steps/sec.
Search speed, regular: 107 steps/sec.

The PRO-2052 is lightweight because there is no chassis and the cabinet is entirely plastic. It feels "cheap." A 12 VDC wall wart (supplied) furnishes power. Components are surface mounted on a main printed circuit board and a second board located behind the front panel. We connected a CTCSS/DCS display to the discriminator test point (marked TP DS) using the solder pad portrayed in Figure 2.

The triple conversion PRO-2050 employs IFs (intermediate frequencies) near 380.7, 10.85 and 0.450 MHz. The PRO-2052 is built around the same IFs but uses a first IF of 254 MHz when tuning 311 - 512 and a 10.7 MHz second IF for WFM reception of TV audio (179.75 - 215.75 MHz). Image rejection on our test unit exceeded 65 dB and that's outstanding.

Harmonics of the crystal controlled 10.4 MHz local oscillator are responsible for weak birdies at 31.2 and 41.6. Our PRO-2052 is fairly sensitive, except in the 1240 - 1300 MHz band.

Our PRO-2052's crisp audio gives us a headache unless we use an external speaker or amplifier with adjustable frequency response. Monaural headphones or an external speaker can be connected through a 1/8" jack on the front panel, though you must increase the setting of the volume control because the audio available at the earphone jack has been attenuated.

❖ Summary

It's great to have military air band coverage and fast scanning. Our PRO-2052's reception is excellent and the radio contains many useful features. The PRO-2052 Owner's Manual is quite good, though programming trunked systems and fleet maps is still too complex. We found the ergonomics and audio quality annoying. Physically, the PRO-2052 feels like a cheap scanner but carries a price tag in the $370 range.

PRO-2052 *$299.95* from Grove. See ad on pg 35.

WHAT'S NEW?

TELL THEM YOU SAW IT IN MONITORING TIMES

Active Select-A-Tenna

Intensitronics, manufacturer of the popular Select-A-Tenna for mediumwave DXing, has just released a new model. Unlike its forerunner, which augmented mediumwave signals by passive coupling, the Super Select-A-Tenna adds a built-in 40 dB amplifier and similar electronics to the respected Kiwa loop. Controls are provided for coarse, fine tune, and peak control for adjusting gain. It can be used with or without direct connection to your radio. The amplified antenna runs on one 9-volt battery (included).

The Super Select-A-Tenna is available for $189.95 from Grove Enterprises (800-438-8155), CCrane (1-800-522-8863), and other dealers. Watch for our review in an upcoming issue.

Radio Shack Multiband Radio

Reader Norman Hill called our attention to a new, inexpensive, multiple band radio from Radio Shack called the Optimus Multiband PLL (phase lock loop) Radio. For $69.99, the radio tunes the AM, FM, SW (3800-12,500 kHz), TV sound (channels 2-13), and weather bands.

Features include 50-station memory: ten stations in each of the five bands may be stored into memory. A full key pad allows direct entry to easily tune in any AM/FM/SW station frequency.

Backlit liquid-crystal clearly shows the time and displays the currently selected station. You can set time on (alarm) or off (sleep). A dual time feature allows you track the time in a different time zone. Power is by four AA cells. Radio Shack does not elaborate on whether there is a power adaptor input or whether the clock can display 24-hour (and, therefore, UTC) time. Check out Radio Shack catalog number Cat.# 12-808.

Coax Switch

Convenient for your radio shack or for DXpeditions, the new coax switch console from Alpha Delta is surge protected, accepts connections from four antennas, and is sturdy enough to stay put without heavy coax pulling the box backward off the desk! The heavy cast housing is an attractive, powder coated black. The console comes in two models: Delta-4C console made to accept UHF connectors ($139.95), or the Delta-4CN, designed for N connectors ($149.95). See the dealer nearest you, or call Alpha-Delta Communications at 606-598-2029 for information.

24-Hour Clocks from MFJ

The DXer's Dream is a 24-hour quartz wall clock from MFJ Enterprises which shows you at a glance 24 hour time, 12 hour time, day of the week and day of the month. The large, 12-inch diameter face displays 24 hour time, and the three inner rings convey the additional information. All dials can be independently set for special formats. Clock face is white with black trim ring and gold accents. MFJ-125 is $29.95 from MFJ Enterprises.

Another 24-hour clock of interest to hobbyists centers on a world map. With the clock set to 0000 hours in England, the clock will always tell you the time in UTC. The clock will also act as a visual aid in calculating local time anywhere in the world. This 12-inch diameter clock features a blue and brown map background, bright red hands, and silver hour digits against a black trim ring. Detailed cities with + or - hours are lined on the outside silver trim in red and blue. The MFJ-115 is $24.95.

Both clocks run on one AA battery (not included) and come with a one-year warranty.

Contact MFJ Enterprises, 800-647-1800, MFJ Enterprises, Inc., P.O.Box 494, Mississippi State, MS 39762; **www.mfjenterprises.com**

Luxury for the VX-5

Another in the line of protective pouches that fit your radio like a glove is the PowerPort Radio Glove for the Yaesu VX-5. Not only does it protect your radio in luxurious glove leather, but the sturdy belt clip holds it securely to your belt and a convenient pocket holds your extra antenna tip close at hand.

Every soft leather pouch from Cutting Edge Enterprises is only $19.95 each, from Gloves to fit handi-talkies to micro radios and Family Radio Service radios. Call Cutting Edge Enterprises at 800-206-0115, email *cee@cruzio.com* or write 1803 Mission Street, Suite 546, Santa Cruz, CA 95060, to see if they have a model to fit your radio.

The Voice of the Crystal

Have you ever wondered what it would be like to live in the early days of radio, fashioning components out of various raw materials? H. Peter Friedrichs' new book will show you how to live that experience through the magic and fun of the crystal set.

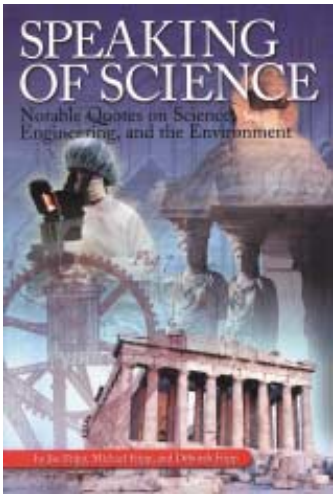
Imagine assembling your own headphone, rolling your own capacitor, contriving a cat's whisker detector. Yep, it can be done, and when you're finished, your crystal radio can rival the old timers!

Friedrichs also provides insights into boosting performance, while still following the home-brew approach. His conversational style of writing, hand-drawn illustrations and useful building tips combine to make this a most enjoyable read. And while you're at it, request their free catalog of other excellent publications.

The Voice of the Crystal, $14.95 plus $3.50 shipping from The Xtal Set Society, PO Box 3026, St. Louis, MO 63130; phone (314) 725-1172.

Speaking of Science

"Man will never reach the moon



regardless of all future advances" (Lee de Forest, 1967). "Hitch your wagon to a star" (Ralph Waldo Emerson, 1870). "If we knew what it was we were doing, it would not be called research, would it?" (Albert Einstein).

This marvelous collection by Jon Fripp, Michael Fripp, and Deborah Fripp contains hundreds of quotations about science – some profound, some prophetic, and some pathetic, but all great reading. Whether you're looking for a book to enjoy and not worry about having to leave it in mid-chapter, or you're preparing for a presentation and looking for some truly great quotes, you can't do better than the Fripp's new compilation of notable comments from recent and distant past.

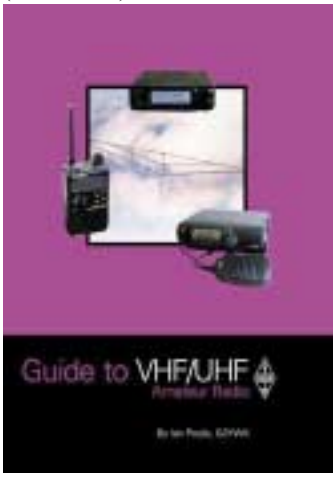
Speaking of Science, $14.95 from LLH Technology Publications, 3578 Old Rail Rd., Eagle Rock, VA 24085; phone (540) 567-2000, or e-mail *carol@llh-publishing.com*.

Guide to VHF / UHF Amateur Radio

A new book by Ian Poole (occasional free-lance author for *Monitoring Times*) has recently been published by the Radio Society of Great Britain. Says the author, "It would be of particular interest to anyone visiting the UK and wanting to understand [amateur] operating techniques required for the UK. It also details many aspects of VHF / UHF operation applicable around the world."

The 112-page book covers many of the aspects of operating an amateur radio station on these bands showing how much variety there is and how to make the most of the hobby. Chapters include propagation characteristics of the band, bandplans, equipment, DXing and awards, modes, and more.

Guide to VHF/UHF Amateur Radio ISBN 1 872309 585 is published by the Radio Society of Great Britain and priced at £8.99 (US$14.21) for non-members.



Available from Radio Society of Great Britain, Lambda House, Cranborne Road, Potters Bar, Herts, UK, EN6 3JE. Tel: +44 1707 659015. Internet: **www.rsgb.org**

The Forrest Mims Circuit Scrapbook

Anyone who has ever read *Popular Electronics* or *Modern Electronics* magazine will recognize the revered name of Forrest Mims, one of the most prolific construction article writers in the history of radio.

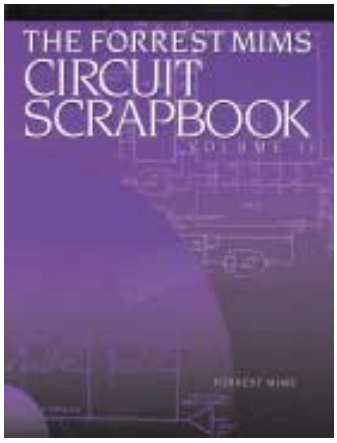
The Forrest Mims Circuit Scrapbook, Volumes I and II, represent a cross-section of Mims' work for nearly three decades and consist of his own favorite projects. Each short title is illustrated with a hand-drawn schematic diagram and is accompanied by his own easy-to-read explanation of just how the circuit works.

Volume I includes experiments in analog computers, light sensors, noise generators, simple AM radios, remote sensing devices, joystick projects, photoelectric projects, LED bargraph applications, miniature power supplies, digital circuits, quartz clock oscillators, games, and flashers.

Volume II, a little larger, offers a wide variety of one- and two-transistor projects from audio generators through DC/DC and DC/AC converters and inverters through flashers and timers – and that's just chapter one! The rest of the book hosts hum and noise filters, pulse and function generators, event counters, LASER diode experiments, intrusion alarms, infrared communications, radio control and servomechanisms, remote and aerial photography, pressure transducers, sound level measurement and activation, hydrophones, anemometers, nuclear radiation detectors, ultrasonic rangefinders, piezo and thermo electronics – and on and on!

If you've always wanted to experiment with electronics, but don't have the time to do it, here's where you start. Virtually every project can be built in an evening and certainly over a weekend.

Volume I, $19.95, and Volume



II $24.95, are available from LLH Technology Publications, 3578 Old Rail Road, Eagle Rock, VA 24085. Order toll-free 800-247-6553, or visit **www.LLH-Publishing.com**.

Hamtronics Kits

If VHF/UHF receivers, transmitters, repeaters, converters, preamps, etc. are your interest, but time is at a premium, skip the construction book: just go for the kit. You can't go wrong with the first-quality kits from Hamtronics. To view their catalog, go to **www.hamtronics.com**, or write for

a printed catalog at Hamtronics, Inc., 65-M Moul Rd, Hilton, NY 14468-9535 or call 716-392-9430. Tell them *Monitoring Times* sent you!

Let your computer do the math

The venerable HAMCALC computer disk loaded with "painless math and design programs for radio amateurs and professionals" has outgrown its boots and moved to CD. HAMCALC version 43 contains 250 programs, many of them entirely new or upgraded versions of existing programs.

Anyone who has used this amazing resource – provided since 1993 for the cost of materials and airmail by George Murphy, VE3ERP – doesn't need any further introduction. There's something for everyone on this CD, you don't have to be a ham radio operator. If you haven't tried it, you have nothing to lose; just send your US$7.00 check or money order to George Murphy VE3ERP, 77 McKenzie St., Orillia, ON L3V 6A6, Canada (email, *ve3erp@encode.com*)

Books and equipment for announcement or review should be sent to " What's New?" c/o Monitoring Times, P.O. Box 98, 7540 Highway 64 West, Brasstown, NC 28902. Press releases may be faxed to 828-837-2216 or emailed to mteditor@grove-ent.com.

MT REVIEW

Nil-Jon Scanner Antennas

By Bob Grove

A relative newcomer to the consumer antenna marketplace is Nil-Jon, offering several models for TV and FM broadcasting, amateur, and scanner listening. We decided to take a look at two wideband scanner antennas since the promotional literature issued by the company gives them rave reviews.

The Big Base

It seemed fair to compare the big base model with two perennial favorites, the Channel Master 5094 Monitenna and the Antenna Craft Scantenna. Both of these antennas have so far been unbeaten for wide frequency coverage, excellent reception, and low cost. Their receiving performance and architecture are virtually indistinguishable.

With the Nil-Jon selling at nearly three times the cost ($129.95 vs. $49.95) of its two competitors (which include 50 feet of coax as well), it had better offer something special.

The Nil-Jon is shipped as a semi-kit, roughly a dozen element pieces, interconnect cables, splitter, boom, and a bag of nuts and bolts. Using the enclosed (old edition) directions to sort parts and then assemble the rig took about half an hour. The new manual is a vast improvement.

The competitors' antennas come fully assembled, requiring only fanning out the elements which then latch into position. All three antennas require attaching their respective balun transformers and U-bolt brackets. Common tools (screwdriver, pliers, etc.) are required to assemble the antenna.

The marked difference between the Nil-Jon and its two competitors is its use of three independently fed elements. While the competitive antennas are essentially comprised of a single vertical element with parasitic elements hinged to it in an "X"-like configuration, the Nil-Jon's three separate vertical dipoles are mounted on clear acrylic plates and spaced wide enough to avoid interaction which could skew the omnidirectional pattern of the antenna.

The piping used for the elements is seamless aluminum conduit (3/4"D, .035" thick) bearing the mill's stamp; this is much larger than used in either of the competitors, and gives it an edge in the durability department. It is rather crudely cut, however, giving the ends of the tubing a ragged, home-brew look. But that doesn't affect its performance.

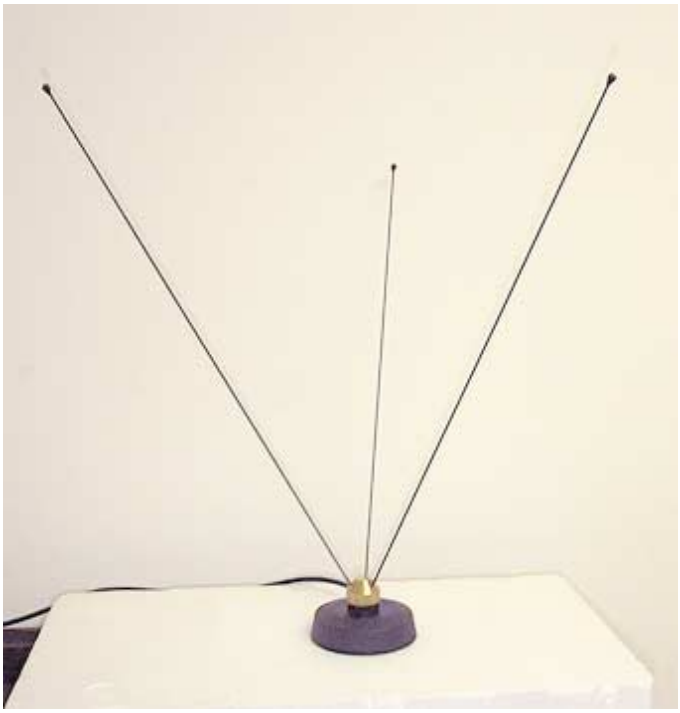
The elements are off-center fed like the Grove Omni, resulting in a balanced, high-impedance feed point, matched by three conventional VHF/UHF TV balun transformers. Three lengths of F-connector-fitted RG6/U coax route the signals from the balun transformers to a three-way VHF/UHF TV splitter, connected in reverse as a signal combiner. The combined signals are then led to the receiver or scanner via the owner's F-connector-fitted cable. We would recommend anchoring the longest of the three interconnect cables to the boom with PVC electrical tape to keep it from flapping in the wind, possibly subjecting it to premature failure.

So How Does it Work?

To do a fair comparison, the Nil-Jon was mounted in the same position as a Scantenna, separated by several feet to avoid incorrect readings resulting from interaction of the elements. Using an Icom R7100 receiver as the test instrument, several steady carriers were selected in the 30, 90, 120, 150, 160, 300, 420, 450, and 860 MHz bands.

After a reading was taken from the Scantenna, the coax lead-in was switched to the Nil-Jon. Just to confirm the results, the coax was then reattached to the Scantenna and signal strengths were again measured. Unexpectedly, within visual limits, every signal was identical on all frequencies!

No attempt was made to measure characteristic impedance or VSWR. Transmitting into the antenna is probably possible if the power is low, limited primarily by the small components used in the transformers and splitter.



The Bottom Line

In order, the flimsiest construction is the Scantenna, although its history shows very little damage from wind and weather—most damage is incurred from rough handling during shipping! It is made from rolled and seamed aluminum tubing of the TV antenna variety. Next, the Monitenna, which is assembled from seamless tubing and is more durable. Both antennas reflect typical assembly line construction and finishing.

Strongest of all is the Nil-Jon with its heavy-gauge tubing and heftier boom, in spite of its homemade appearance. While we noted no difference in signal reception among the three contenders, the Nil-Jon's durable construction may give it an edge under severe wind load conditions.

The Mag Mount Mobile

This was a pleasant surprise. The appearance of the HD-V/U-Super-M mobile antenna itself is unusual, with three slightly-different-length VHF-Hi band whips all radiating upward at an angle from the base (see photo). At first glance, one might think that the purpose of the separation is to prevent interaction which might degrade a broadbanding design, similar to a dipole cluster of different lengths, each resonant at a different frequency.

But there is an added advantage to this design. At higher frequencies, as an element becomes electrically longer, the radiation and reception pattern starts to favor the ends. By angling the whips downward, this pattern is also lowered toward the horizon. Now the extra length has gain over the quarter-wave whip, providing better performance. And angled downward, the antenna cluster is less likely than a comparative single vertical element to strike overhead obstacles.

The Bottom Line

So does it really do this? You bet! The Super-M was compared to an 18" whip, the Grove ANT-30 Stealth, and even a cellular gain antenna, all popular favorites for scanner monitoring as well as VHF/UHF transmitting.

In every case, the Nil-Jon Super-M equaled or outperformed the contenders, sometimes by a substantial amount! And even though the manufacturer advertises it for 140-170/400-480 MHz communications, for receiving purposes, it works well past the 800 MHz band.

The antenna consists of three black-enameled and rubber-tipped elements (16" to 18-1/4"), a machined brass base, and a Larsen 3-1/2" magnetic mount. A 12-foot length of RG-58/U coax terminates in a PL-259 connector for attachment to two-way radios; an optional UHF/BNC adaptor is required for scanners.

HD-SCAN-WB-OMNI-F base antenna, $129.05 plus shipping. HD-V/U-Super-M mobile antenna, $64.95 plus $7.50 shipping. From Nil-Jon Antennas, PO Box 764, Amherst, OH 44001; ph. (440) 989-2295. Web site **www.nil-jonantennas.com**; e-mail *pfb@eriecoast.com*.

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Closing Comments

By Bob Grove, Publisher

New Senate Bill Could End Scanner Use!

Over the last two years, the Senate wisely ignored HR-514, a Bill introduced by the House of Representatives pretending to add privacy protection to cell phone users. An obvious concoction by the Cellular Telephone Industry Association (CTIA), HR-514 would have penalized the scanner industry and scanner owners to cover up cellular's failure to provide privacy for their customers.

Fortunately, the Senate wasn't moved; they recognized the commercial taint of the Bill and ignored it until it died of natural causes. But sadly, as we learned from Billy Tauzin's shameful performance in front of his telecommunications subcommittee, personal agendas of politicians are fashioned from campaign contributions, and the CTIA is a major contributor.

The Bill has a persistent commercial history. During the 105th Congress, Edward Markey (D-MA) introduced HR 1964; fortunately, it never got out of Committee. The failure was re-ignited as HR 2369 by Billy Tauzin (R-LA), chairman of the House Subcommittee on Telecommunications, Trade, and Consumer Protection, where it passed the House vote, but subsequently – and appropriately – died in Senate Committee.

Then it was re-wrapped by Heather Wilson (R-NM) as HR 514, where it passed the House and was referred to the Senate, where it, too, languishes with no action taken. But the repeated Senate messages apparently had little effect on the cellular puppets of the House Subcommittee.

Now we see a "new" Bill, S.2326, fatuously introduced by CTIA's Senatorial representative, Ron Wyden (D-OR), whose favors cost his communications and electronics contributors nearly a half million dollars over the past five years. It doesn't take a lot of effort to make good money in Congress – this Bill is word for word the previously ignored HR-514!

The Bill is cosponsored by Senator Conrad Burns (R-MT), whose Web site proudly boasts that successful passage of his Bill will "End Use of Some Scanners." Burns is Chairman of the Senate Subcommittee on communications. The Bill is being introduced as only a part of a larger privacy package the two Senators are currently preparing.

Let's take a more pragmatic look at why this Bill must never be taken seriously. First, the majority of it is a rehash of existing laws – prohibitions against modifying scanning receivers, manufacturing of alterable scanning receivers, marketing of cellular-capable scanning receivers, and on and on. These regulations are all in place and are being enforced.

More important, however, is that it introduces a vague, sweeping mandate to the FCC to protect the privacy of shared-frequency users, a poorly worded paragraph which could conceivably outlaw scanning receivers altogether, to wit:

"The Commission shall, with respect to scanning receivers capable of receiving transmissions in frequencies that are used by commercial mobile services and that are shared by public safety users, examine methods, and may prescribe such regulations as may be necessary, to enhance the privacy of users of such frequencies."

Note the absence of the logical and affordable recommendation that the service provider encrypt or scramble the transmissions. The paragraph clearly provides a means to outlaw scanners that can receive the frequencies, and not just telephone frequencies. A quick look at the table of frequency allocations, which shows the number of shared frequencies, to be compounded by spectrum refarming and the ability of public safety users to operate on virtually any mobile radio frequency, reveals the inevitable consequence.

When I testified in front of Tauzin's subcommittee in Washington during 1997 to protect the listening privileges of radio hobbyists, he told me that he had been asked by law enforcement representatives to prohibit the monitoring of police radio transmissions. This single paragraph, if passed, could do it. And since public safety is the number one interest in scanner monitoring, such a prohibition would ring the death knell for scanners.

The consequences would be enormous. Radio, TV, newspapers, magazines, and other newsgathering organizations would lose their ability to monitor public safety transmissions. Sports enthusiasts would be denied the radio excitement of air and auto races. Radio amateurs could no longer use scanners to assist in life-saving services during natural disasters and civil emergencies. Military and government agencies – including public safety – would be denied inexpensive scanning receivers presently used in their daily operations. And most frightening of all, the American public would be denied the ability to monitor the appropriate behavior of their law enforcement agencies, and even to assist – as they often do – in the apprehension of suspects through monitoring police channels.

But it isn't too late for you to protest ill-proposed Senate Bill S.2326. Let your Senator know your feelings now! If you don't know your Senator's name and address, you can find it at the library, by contacting your local newspaper, by looking in your telephone white pages under U.S. government, or by visiting the Web site **www.senate.gov**/ and selecting your state.

Let your representatives in Washington know your feelings about this Bill immediately! Here's how to contact them:

Senator Ron Wyden (D-OR) Introduced Senate 2326
516 Hart Senate Office Building
Washington, DC 20510
(202) 224-5244
www.senate.gov/member/or/wyden/general/mail.htm

Senator Conrad Burns (R-MT)
Chairman of Senate Commerce, Science, and Transportation Communications subcommittee
187 Dirksen Senate Office Building
Washington, D.C. 20510
(202) 224-2644
(202) 224-8594 fax
(202) 224-8616 TDD line
Toll-free 1-800-344-1513

The committee that will hear this bill is the US Senate committee on Commerce, Science and Transportation.
Phone:
(202) 224-5115 (Committee Public Information)
(202) 224-1251 (Majority Side/Republican)
(202) 224-0411 (Minority Side/Democrat)
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(202) 224-1259 (Majority Side/Republican)
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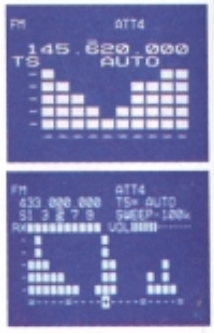

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